

# **CIRCULAR ECONOMY DEFINITIONS AND ASSESSMENT IN FINNISH MEDIA**

**Jyväskylä University School  
of Business and Economics**

**Master's thesis**

**2017**

**Juliana Koskela  
Corporate Environmental Management  
Tiina Onkila**



## ABSTRACT

Author Juliana Koskela	
Title of thesis Circular economy definitions and assessment in Finnish media	
Discipline Corporate Environmental Management	Type of work Master's thesis
Time (month/ year) 4/2018	Number of pages 59
<p>Abstract</p> <p>The purpose of this research is to find out how the concept of circular economy is assessed in the Finnish media, what definitions are given to the concept and how those definitions differ from the ones given in academic sources. Using a theory originated approach I examine the definitions given to circular economy in the research data. As data I use articles of Helsingin Sanomat newspaper during the years 2015-2017. This study takes a mixed methods approach; I use qualitative content analysis along with quantifying the data as research methods. By filling in an analysis framework I analyse how seven main characteristic groups of circular economy are assessed in the Finnish media during the researched time period. The research findings indicate that very similar definitions are given to circular economy in the data and in the research literature. However, more features are used to describe circular economy in the literature sources compared to the data. Different features are also emphasized in the sources. Design, reuse and circular business and industrial models are the three features that have the largest difference in their appearance rate. The analysis also shows that opinionated texts are an important platform for discussion on circular economy.</p> <p>The research problem, the importance and the aim of the research along with two research questions are defined in the introduction. I then present the theoretical framework, which consists of an overview of circular economy and features given to the concept in the research literature. I combine similar and overlapping features to form seven main characteristic groups that will act as a basis for the research analysis. In the theoretical framework I also present information on the role of media in society and as a creator of definitions. The data collection and analysis methods are presented next, after which the research findings are described. Finally, in the discussion chapter, I answer the research questions and make suggestions for future research.</p>	
Keywords: Circular economy, collaborative consumption, circular business models, regenerative design, sustainability	
Location: Jyväskylä University School of Business and Economics	

## ABSTRAKTI

Tekijä Juliana Koskela	
Työn nimi Kiertotalouden määritelmät ja käsittely suomalaisessa mediassa	
Oppiaine Yritysten ympäristöjohtaminen	Työn laji Pro gradu -tutkielma
Aika 4/2018	Sivumäärä 59
Abstrakti	
<p>Tämän tutkimuksen tarkoituksena on selvittää miten kierrotalouden käsitettä käsitellään suomalaisessa mediassa, mitä määritelmiä sille annetaan ja miten määritelmät eroavat akateemisissa lähteissä annetuista määritelmistä. Tutkin teorialähtöisesti, miten kierrotalous on määritelty aineistossa, joka koostuu Helsingin Sanomien artikkeleista vuosina 2015-2017. Tämä tutkimus käyttää sekä määrällisiä- että laadullisia tutkimusmenetelmiä; yhdistän laadulliseen sisällönanalyyysiin aineiston määrällistämistä. Käytän sisällönanalyyysitaulukkoa analysoidakseni kuinka akateemisesta aineistosta identifioidut seitsemän kierrotalouden ominaisuutta esiintyvät media-aineistossa.</p> <p>Tutkimustulokset viittaavat siihen, että kierrotalouden käsitteelle on annettu hyvin samankaltaisia määritelmiä niin akateemisessa- kuin media-aineistossakin. Akateemisessa aineistossa kuvaillaan kierrotalouden ominaisuuksia kuitenkin enemmän. Myös ominaisuuksien painotukset ovat erilaiset. Kierrotalouden mukaisen suunnittelun, uudelleenkäytön, kierrotalouden liiketoimintamallien ja teollisuuksien toimintamallien esiintyvyydessä oli merkittävämmät erot aineistojen välillä. Analyysin perusteella voi päätellä, että mielipiteelliset sisällöt olivat suosittuja alustoja kierrotalous keskustelulle.</p> <p>Esittelen tutkimuskysymykset ja tutkimuksen tavoitteet tutkielman johdannossa. Tämän jälkeen kuvaan teoreettisen viitekehyksen, johon sisältyy yleiskatsaus kierrotalouteen ja sille akateemisissa aineistossa annettuihin ominaisuuksiin. Yhdistän samankaltaisia ominaisuuksia ja muodostan seitsemän pääominaisuutta kierrotaloudelle. Näitä seitsemää ominaisuutta käytän analyysin pohjana. Teoreettisessa viitekehyksessä esitän myös tietoa median roolista yhteiskunnassa ja yleisenä määritelmien muodostajana. Seuraavaksi kuvaan aineistonkeruu- ja analyysi menetelmät, jonka jälkeen avaan tutkimustulokset. Viimeisessä kappaleessa vastaan tutkimuskysymyksiin ja pohdin jatkotutkimusehdotuksia tulevaisuutta varten.</p>	
Asiasanat: Kierrotalous, jakamistalous, kierrotalouden liiketoimintamallit, kestävä suunnittelu, kestävyys	
Säilytyspaikka Jyväskylän yliopiston kauppakorkeakoulu	

## CONTENTS

	ABSTRACT .....	2
	ABSTRAKTI .....	3
	List of figures.....	5
	List of tables.....	6
1	INTRODUCTION .....	7
1.1	Research problem .....	7
1.2	Importance and aim of research .....	8
2	THEORETICAL FRAMEWORK.....	9
2.1	Circular economy.....	9
2.1.1	Phenomenon.....	9
2.1.2	Linear vs. circular economy .....	10
2.1.3	The concept of circular economy.....	10
2.1.4	Features of circular economy .....	11
2.1.5	Main feature groups identified in the literature .....	18
2.1.6	Difficulties of circular economy.....	19
2.1.7	Circular economy in Finland .....	20
2.2	Power of media .....	20
2.2.1	Purpose of mass communication .....	20
2.2.2	Media in society .....	21
2.2.3	Media as a creator of definitions and image.....	22
2.2.4	Medias influence on the perception of circular economy.....	23
3	DATA AND RESEARCH METHODS .....	25
3.1	Research design.....	25
3.2	Data collection.....	25
3.2.1	Data sources.....	26
3.2.2	Data collection methods .....	26
3.3	Analysis process.....	30
3.3.1	Content analysis overview .....	30
3.3.2	Content analysis in this research.....	32
4	RESEARCH FINDINGS .....	34
4.1	Quantitative findings .....	34
4.1.1	Appearance of academic features for circular economy in the media data .....	34
4.1.2	Appearance of academic features for circular economy in the media data during different years .....	38
4.1.3	Appearance of academic features for circular economy in different sections of the newspaper.....	41
4.2	Qualitative findings.....	44
4.2.1	Reuse.....	44
4.2.2	Recycle.....	44

		4
4.2.3	Design.....	45
4.2.4	Circular business and industrial models.....	46
4.2.5	Supporting tools.....	47
4.2.6	Collaborative consumption.....	48
4.2.7	Renewable resources.....	48
5	DISCUSSION .....	49
5.1	Answering the research questions .....	49
5.1.1	How is the concept of circular economy comprehended and assessed in the Finnish media?.....	49
5.1.2	Do the definitions given to circular economy in the media differ from those given in the literature?.....	50
5.2	Relationship with previous research .....	52
5.3	Reliability and validity.....	52
5.4	Suggestions for future research .....	54
	REFERENCES.....	55
	APPENDICES.....	59

## LIST OF FIGURES

<b>Figure 1:</b> Linear economy vs. circular economy (Sauve, Bernard & Sloan 2016)	10
<b>Figure 2:</b> Material flow in a circular economy (Ellen MacArthur Foundation 2012) .....	16
<b>Figure 3:</b> Forming of image (Karvonen 1999 p.52) .....	23
<b>Figure 4:</b> Forming of image based on media (Karvonen 1999 p. 78) .....	23
<b>Figure 5:</b> Academic characteristics in the media data and in the academic literature.....	37
<b>Figure 6:</b> Academic characteristics in the media data during different years....	39
<b>Figure 7:</b> The distribution of the media data between different newspaper sections .....	42

## LIST OF TABLES

<b>Table 1:</b> Main features of circular economy identified in the literature.....	12
<b>Table 2:</b> Circular economy in business models (Urbinati et al. 2017).....	15
<b>Table 3:</b> Main feature groups of a circular economy .....	18
<b>Table 4:</b> Hits on Helsingin Sanomat article search.....	27
<b>Table 5:</b> List of Helsingin Sanomat articles .....	29
<b>Table 6:</b> Steps for conducting qualitative analysis (Tuomi & Sarajärvi 2002 p. 94) .....	30
<b>Table 7:</b> Example of a content analysis framework (Tuomi & Sarajärvi 2002 p. 116) .....	31
<b>Table 8:</b> Example of quantifying data .....	32
<b>Table 9:</b> Content analysis topics.....	32
<b>Table 10:</b> Analysis framework 1.....	36
<b>Table 11:</b> Difference between frequency of academic characteristics in the media data and in the academic literature.....	38
<b>Table 12:</b> Analysis framework 2.....	38
<b>Table 13:</b> Analysis framework 3.....	41
<b>Table 14:</b> Main characteristic groups of circular economy according to the difference of their appearance in the research literature and in the data.....	51

# 1 INTRODUCTION

Due to the indisputable effects of climate change and the unsustainable nature of our current economic development model, there is a pressure for economies and companies to develop more sustainable practices and systems. A recent more sustainable economic development model is circular economy, which aims at resolving the limitations of the current take-make-dispose model.

Circular economy is a modern approach to economic growth with a far less burdening impact on the environment than the current approach. It includes various kinds of key attributes that forms a system which allows economic growth without compromising the finite resources of the Earth. It contributes to decreasing emissions and stopping climate change and global warming, which makes it an important concept regarding the future of the Earth and generations to come.

Circular economy is a broad concept and includes various aspects and a systematic shift of the economy. This research investigates the way in which the concept of circular economy has been assessed and definitions given to the concept in the Finnish media. Definitions given in the media are compared to the definitions given in the academic literature.

In this research I first present the theoretical framework. The theoretical framework consists of assessing the concept of circular economy and the definitions given to it in academic sources. The key attributes of circular economy appearing in the literature are identified and presented. The theoretical framework also includes theories on the power of media in society and as a creator of definitions. I then present the data collection- and research methodology, which consist of presenting the data sources and collection methods as well as a content analysis overview. After that I will present the research findings including quantitative findings and qualitative findings. Finally, I will discuss the meanings of the research findings and link them to the theoretical framework to answer the research questions in the last chapter. Chapter five also includes discussion on the relationship of this study with previous ones, reliability and validity as well as suggestions for future research.

## 1.1 Research problem

The research problem for this paper rised from my experiences with and interest towards the concept of circular economy. I was interested in environmental issues and climate change and during my studies I learned a lot about the potential of circular economy as a more sustainable economic model, which allows economic development and growth without compromising the environment. I noticed that for some reason the discussion in the media about circular economy



rotated around very few attributes of the term compared to the attributes mentioned in academic sources. Whenever seeing the term 'circular economy' mentioned in media outlets such as newspapers, it was, according to my experiences, usually associated with recycling. Ghisellini, Cialani & Ulgati (2016) also state: "*CE has often been considered only as an approach to more appropriate waste management.*" This lead me to wonder if the concept is generally misinterpreted in the media or if a narrow understanding of the concept is distributed by the media.

## 1.2 Importance and aim of research

The importance of this research derives from the potential of circular economy. If there is a possibility of mitigating global warming without compromising our high standard of living by transforming our economic model towards a more circular one, it is an important topic to be researched. Media has a lot of power in today's society and by misrepresenting the term circular economy, the true potential of the concept might be missed. Ghisellini et al. (2016) also state: "*Such very limited point of view (considering circular economy only as an approach to more appropriate waste management) may lead CE to fail.*" Therefore, it is important to research the use of the term in media outlets.

The aim of this research is to find out how the term circular economy is defined in the Finnish media compared to the research literature and what kind of discussion evolves around this concept in the Finnish media. Setting clear research questions is important in the process of conducting a research. Research questions set a target for the research and are important in focusing and narrowing down the research area. (Eriksson & Kovalainen 2008 p. 48) The research problems and aims of this research can be concluded into these two research questions:

1. *How is the concept of circular economy assessed and comprehended in the Finnish media?*
2. *Do the definitions of circular economy given in the media differ from those given in the research literature?*

## 2 THEORETICAL FRAMEWORK

This chapter will present the theories used in the research. The first part of this chapter will focus on the circular economy as a phenomenon and concept. The features given to circular economy in the academic literature reviewed for this study are also presented in the first part of this chapter. The second part focuses on media, its purpose and its power in creating definitions in society as well as for circular economy.

The literature reviewed for the theoretical framework consists mainly of academic articles. Because the concept of circular economy has been widely developed by non-academic players, reports of other origins than academic journals were included to assess the concept of circular economy. For example, the Ellen Macarthur Foundation has been a big player in mapping out the concept globally and Sitra has been developing the concept in Finland. Thus, the reports of these organisations were seen important to include in the literature. The articles and reports are referred to as academic sources in this paper.

### 2.1 Circular economy

#### 2.1.1 Phenomenon

Since the time of industrialisation, our economy has continued to grow. With modern technologies, we are able to produce goods more cheaply and quickly. Mass production has made low cost goods available for people in lower-income classes. The population of the Earth is growing and standard of living is rising. Therefore, also the need for consumer goods is growing. This has resulted in unsustainable use of natural resources and lead to global warming, which threatens the economy and the future of our species in the long run.

In sixty years the global economy has quintupled and people have become wealthier (Richardson 2013 p. 3). Economic growth is generally seen as a sign of welfare because it implies the rise of living standards. Continuous economic growth is desirable for every economy. However, the welfare of the environment is often in contrast with economic growth because an economy that is wealthier also usually consumes more and therefore requires more resources and stress on the environment. As economic growth has occurred during the past sixty years, approximately sixty per cent of the Earth's life- and livelihood-supporting ecosystems have been degraded (Richardson 2013 p. 3).

The difficulties of a growing world population and restricted environmental resources has led to development of alternative economic models that take into consideration the capacity of the Earth. Circular economy is one of these models, taking a closed-loop approach to resource use and thus overcoming the restrictions of environmental sustainability to economic growth.

### 2.1.2 Linear vs. circular economy

To understand the foundation of circular economy one must first understand the current situation of the 'take-make-dispose' economy. The current economic development model is called linear economy. In this model natural resources are transformed into waste by production and consumption. Raw materials are extracted, the product is manufactured, distributed, used and disposed. The life cycle of the resources end when the product is disposed. Even if the method of disposal is burning for energy generation, most of the energy in the material is lost. The problem with this model is that natural resources are finite and the Earth's sustainable capacity for waste and pollution is also restricted. The linear economic model is threatening the ecosystems that are vitally important for continuous economic growth and the survival of the human species. (Ghisellini et al. 2016)

The negative impacts and the unsustainability of the current economic development model has led to a pressure to create alternative models. Circular economy is one of them. It responds to the problems of the linear model by taking a closed-loop perspective. Circular economy is the most recent way in which economic growth can be achieved in harmony with the environment. **Figure 1** illustrates simplified material cycles in a linear and a circular economy. (Murray, Skene & Haynes 2017)

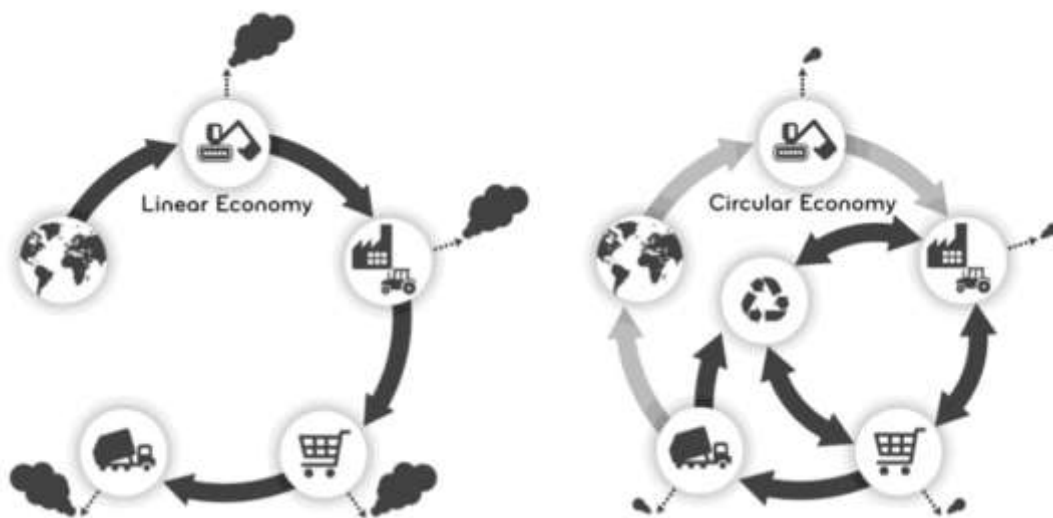


Figure 1: Linear economy vs. circular economy (Sauve, Bernard & Sloan 2016)

### 2.1.3 The concept of circular economy

The term 'circular economy' resembles the circulation of materials in an economy, which is an important part of the concept. It also relates to the recycling aspect of the concept. The roots of circular economy lie in the theoretical concepts of cradle-to-cradle, regenerative design, blue economy, biomimicry and industrial

ecology. These theoretical concepts have the closed-loop approach to resource use in common and they have helped in shaping the circular economy concept. (Lieder & Rashid 2016)

Circular economy is identified in the literature as a way for enabling economic growth without compromising environmental sustainability. It is described as an economic model in which resources are used efficiently and recycled. It is designed to be restorative and efficient. Used materials are put back into the loop as resources, which allows the amount of waste and need for new raw materials to be reduced to the minimum. This way waste is designed out of the system. Life-cycle thinking is an important part of circular economy. (Ghisellini et al. 2016)

Circular economy is often associated with terms like recycling, bio economy, cleantech and sustainable development. In reality it stands for a more thorough view and transition of the economic system. It is a variety of features, policies and operational models that form a system called circular economy. It requires many changes in current systems and cultures. Transformation of values, consumption habits, industrial systems as well as technological innovations must occur to reach a circular economy. Effort and commitment is required from producers as well as consumers and governments (Sitra 2016). Circular economy is still a theoretical concept and has not yet been fully adopted by an economy (Ellen MacArthur Foundation 2012), even though its concepts are adopted by different entities to improve environmental performance. A circular economy would provide opportunities for new business models, industries and branches. It would shift the emphasis from raw material extraction to design, repair and recycling sectors. It would also provide innovative employment opportunities (Ghisellini et al. 2016).

### 2.1.4 Features of circular economy

The definitions given in the literature to the concept of circular economy were mapped by forming a content analysis framework (**Appendix 1**). The framework was filled in while going through the literature. Characteristics were added to the framework as they appeared during the reviewing of the literature. The framework illustrates how frequently the different definitions and attributes of circular economy appear in the literature.

Circular economy is a comprehensive system and defines thoroughly how an economy operates. There are various attributes associated with circular economy, the R principles being the most common of them. There have been many variations of the R principles used in various sources (Kirchherr, Reike & Hekkert 2017). The most common variation of the R principles is the 3R principles presented e.g. by Ghisellini et al. (2016) and defined as *reduce, reuse and recycle*.

The key features of a circular economy that were identified in the literature are presented in **Table 1** and explained in this chapter. In total, 22 features were identified in the research literature (see **Appendix 1**). The role of 8 features was so small that they were left out and only the main 14 features are presented in this chapter.

Features of circular economy identified in the literature:

1. Reduce
2. Reuse
3. Recycle
4. Design
5. Service orientation
6. Collaborative consumption
7. Collaborative business and industrial models
8. Circular business models
9. Difference between technical and biological material flows
10. Renewable resources
11. Change in attitudes and values
12. Policies and legislation
13. Innovations and technological development
14. Life cycle assessment (LCA)

**Table 1:** Main features of circular economy identified in the literature

#### *Reduce*

This principle intends to reduce the overall amount of raw materials and energy used in the economy. It can be implemented by developing more efficient ways of production or consumption. Developing new and existing technologies, more efficient or lightweight products and promoting considerate use of products are examples of reduction actions. Eco-efficiency is a term that is related to reduction practices, as it aims to reduce the amount of raw materials compared to the units produced and therefore increase profit. (Ghisellini et al. 2016)

#### *Reuse*

The reuse principle includes any actions done to be able to reuse the product for the same purpose or a different purpose that is was originally intended for. It is a very environmentally friendly option compared to disposal, recycling or producing new products from virgin raw materials. Reuse can be enabled in several ways such as redistribution, repairing, reutilising, refurbishing and remanufacturing. *Redistribution* allows the product to be reused by distributing it again to the next user for example via a second-hand shop. If the product is broken and can be fixed with minor actions, it can be *repaired* to enable reuse. *Refurbishing* is making minor aesthetic changes to the product to enable reuse. *Remanufacturing* is disassembling the product and manufacturing it again with the same materials. Ellen MacArthur Foundation (2012) introduces the term 'cascading' as a means of reuse. It means using the product for another purpose than what it was originally made for after it cannot be used for its original purpose anymore. This can

be also called *reutilisation*. (Ghisellini et al. 2016; Castellani, Sala & Mirabella 2015; Singh & Ordinez 2016)

### *Recycle*

Recycling extracts materials from waste to be used as raw materials or parts for new products. Recycled materials can be used to produce the same product they were extracted from or in the production of a different product. Recycling reduces the need for extracting new raw materials, disposing and waste treatment. Environmental impacts are therefore reduced. Effective recovery systems are required for the success of recycling; materials must be recovered after they have been used so that they don't end up in landfills or energy production factories. Recycling is the least sustainable option out of the 3R principles but is still generally seen as the main attribute in circular economy. It is also the most common implementation method of circular economy currently. Ghisellini et al. (2016) state: "*The implementation of CE (circular economy) worldwide still seems in the early stages, mainly focused on recycle rather than reuse.*" Recycling was used to describe the circular economy concept in all sources of academic literature used in this study. (Ghisellini et al. 2016)

### *Design*

The Ellen MacArthur Foundation (2012 p.7) define circular economy as "*an industrial system that is restorative or regenerative by intention and design.*" The importance of the design phase in a circular economy is emphasised in almost all sources of academic literature used in this research. The life cycle of the materials must be considered in the design phase of the product for circular economy to succeed. Products need to be durable, easy to reuse, disassemble, repair, remanufacture and recycle. For example, standardising components of products will make it much easier to repair and remanufacture. (Ellen Macarthur Foundation 2012)

Ghisellini et al. (2016) emphasize the importance of *eco-design* and *cleaner production* solutions in a circular economy. Eco-design is a term for the consideration of environmental impacts of the whole life cycle in a products design phase. Cleaner production methods are more efficient, pollute less and use less toxic components.

A circular economy also requires well designed material flows across industries and between different entities such as consumers and companies. For successful reuse and recycling, a system where materials find their way to the next user needs to be designed. Recycling points and restoration services must be provided. Simply the entire system must design out waste. Without successful and comprehensive designing, a circular economy would likely fail. (Ghisellini et al. 2016)

### *Service orientation*

In a circular economy the emphasis is shifted from ownership to access of use and from products to services. Because in a circular economy products are de-

signed to be durable and easy to reuse and recycle, the demand for primary products is decreased and the demand for reusing and recycling services is increased. Sitra (2016) points out circular economy is often associated with the concept of *service economy*, where the focus is shifted from the production of new products to finding solutions to problems. Solutions can be e.g. maintenance, repairing or remanufacturing. The consumer is perceived as the user in a circular economy. (Ellen MacArthur Foundation 2012, Ghisellini et al 2016, Sitra 2016)

#### *Collaborative consumption*

Most literature sources identify the need for changed consumption habits in a circular economy. Consumption cannot occur similarly as in a linear economy. In a circular economy, consumers practice collaborative consumption. Instead of owning things, consumers can rent, share, barter, trade or borrow them. This will save resources because the products are only with those who need them and therefore the overall consumption of these products will decrease. Collaborative consumption methods allow the products to find the next user and are therefore a method of *reuse*. There are several paths and ways the products find the next user in a circular economy. These can be e.g. second-hand shops, online platforms for trading and borrowing, and recycling centres. (Ghisellini et al. 2016)

#### *Collaborative business and industrial models*

Businesses and industries work in cooperation in circular economy to reduce environmental impacts and increase resource efficiency and material flow. Collaborative solutions also bring economic benefit to the companies and industries. Waste of one industry or company is raw material for another. Industrial symbiosis and eco-industrial parks are examples of collaboration methods between companies and industries where resources are exchanged to gain environmental benefits. (Ghisellini et al. 2016, Lieder & Rashid 2016, Murray et al. 2017)

Green supply chain management is a key attribute in a circular economy. Urbinati, Chiaroni & Chiesa (2017) point out the importance of reverse supply chain flows. Products must be brought back to the producer after use, so that they can be remanufactured or turned into raw material for other purposes. The same applies for other entities in the supply chain.

#### *Circular business models*

A circular economy requires new business models to take over. Business activities shift from production to services such as repairing, remanufacturing, recycling and rental services. Circular economy also provides opportunities for new innovations and technologies in cleantech and renewable material development among others. It also shifts the attention from more polluting industries to less polluting ones. (Di Maio & Rem 2015, Ghisellini et al. 2016, Sitra 2016, Spring & Araujo 2017, Urbinati et al. 2017, World Economic Forum 2014)

The degree to which circular economy can be seen in companies' business models are divided by Urbinati et al. (2017) into three groups: The Downstream Circular adoption, the Upstream Circular adoption and the Full Circular adoption (see **Table 2**). In the downstream circular adoption, the circular attributes are

marketed to the consumers without actual change in design, production or supply chain features. In the upstream circular adoption, circular attributes can be seen in the design, production and supply chain features of the business without marketing these features to the consumers. In the full circular adoption model, circular economy is adopted in marketing and consumer involvement as well as the internal operations and production systems of the company.

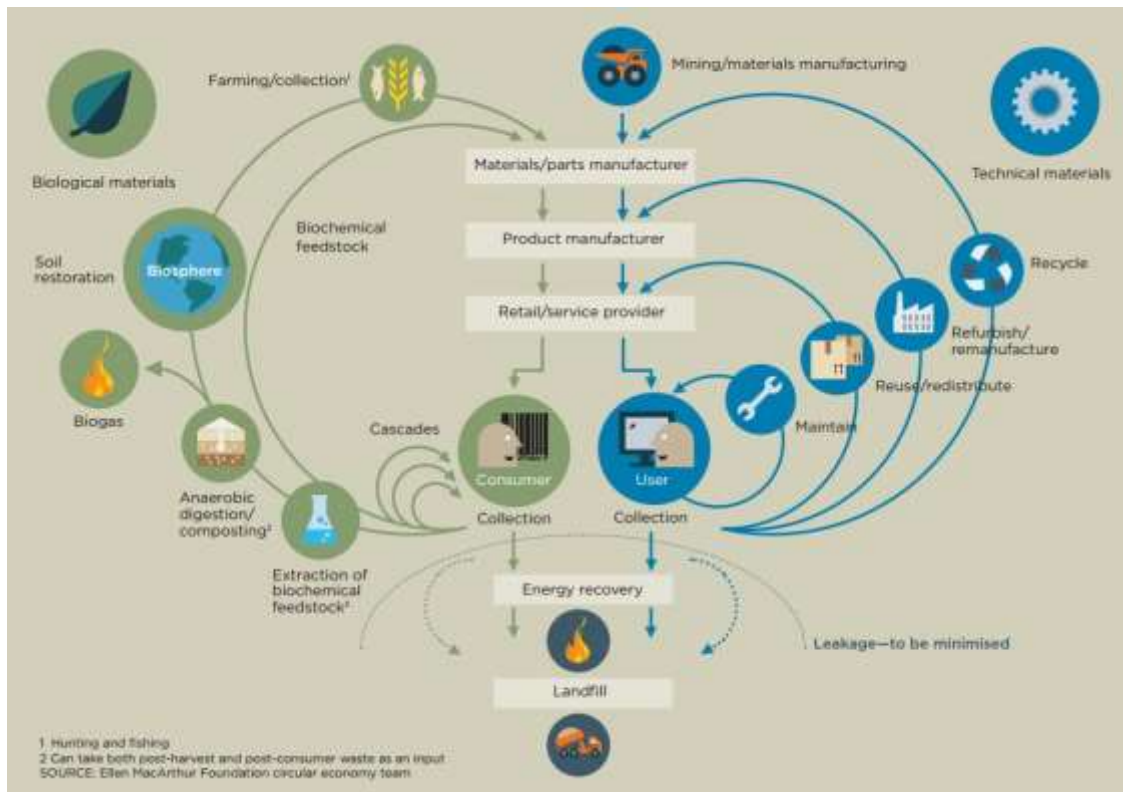
(i) Reverse supply chain activities and higher degree of cooperation with the actors of the supply chain	(ii) Transition from a “pay-per-own” to a “pay-per-use” approach	(iii) Higher degree of cooperation between companies and customers	(iv) Payment for use-oriented or result-oriented services
<b>Value network</b>	<b>Customer value proposition &amp; interface</b>		

**Table 2:** Circular economy in business models (Urbinati et al. 2017)

*Materials: technical and biological*

Several academic sources point out the importance of differentiation between technical and biological materials in a circular economy (Charnley & De Los Rios 2017, Ellen MacArthur Foundation 2012, Lieder & Rashid 2016, Murray et al. 2017, Singh & Ordonez 2016, Sitra 2014, Sitra 2016, World Economic Forum 2014, Zink & Geyer 2017). Material life-cycles play an essential role in a circular economy and they must be designed to eliminate waste. Technical and biological materials have different qualities and therefore their life-cycles differ from each other. **Figure 2** illustrates the material flows in a circular economy. The Ellen MacArthur foundation (2012) states that in a circular economy, biological materials need to be safe to return to the environment by composting after use. Thus, they cannot contain e.g. toxic chemicals. The elimination of toxic chemicals is emphasized also by other sources (e.g. De los Rios & Charnley 2016). Technical materials are designed to be reused and recycled. This way waste can be “designed out” (Ellen MacArthur Foundation 2012).





**Figure 2:** Material flow in a circular economy (Ellen MacArthur Foundation 2012)

### *Renewable resources*

According to a few academic sources, a circular economy supports the use of renewable materials and aims at shifting towards renewable resource use and minimising dependency on non-renewable resources (Geng et al. 2012, Ghisellini et al. 2016, Lieder & Rashid 2016, Sitra 2016, Urbinati et al. 2017, World Economic Forum 2014). The use of renewable sources of energy in a circular economy is emphasised by several sources (e.g. Ellen MacArthur Foundation 2012).

### *Change in attitudes and values*

A successful circular economy requires all involved parties to commit to the required systems and participate in the circular economy. Consumers need to value environmentally friendly products to make better consumption choices. Consumers must also be willing to commit to resource recovery and recycling through various recovery systems. Most academic sources reviewed for this study point out the need for changed consumption habits in a circular economy (e.g. Lazarevik & Valve 2017). This requires a change in attitudes and values among society. Consumption habits also change due to service oriented and collaborative consumption models where the emphasis is shifted from owning products towards accessing them. Change in attitudes and values is required also from companies and other entities such as governments and policy makers to be able to shift the legislation according to circular economy principles. (Ellen MacArthur Foundation 2012, Pomponi & Moncaster 2017)

### *Policies & legislation*

A circular economy requires government policies and legislation to be aligned with circular thinking according to several sources. Government policies, initiatives, legislation and taxation have the power to support circular business models, service orientation, reuse and recycling practices and renewable resource use while complicating non-circular practices. (Geissdoerfer, Savaget, Bocken & Hultnik 2017; Geng et al. 2012; Ghisellini et al. 2016; Lieder & Rashid 2016; Murray et al. 2017; Sitra 2016; Urbinati et al. 2017; Zink & Geyer 2017)

Several studies use China as an example in adopting circular economy into national laws. China's critical situation as a rapidly growing economy and strain on the environment lead it to adopt circular economy in its legislation with the "Cleaner production promotion law" in 2003 and the "Circular economy promotion law" in 2009. China has therefore taken a top-down approach in circular economy adoption, while other areas, e.g. the EU and the USA it has been used more as a bottom-up environmental management tool driven mainly by NGOs and environmental organisations. (Geissdoerfer et al. 2017, Geng et al. 2012, Ghisellini et al. 2016)

There are various tools that governments can use to support the adoption of circular economy operations and attributes. Some policy tools are mentioned by Lazarevik & Valve (2017) and can be divided into regulatory instruments, economic instruments and informative instruments. Regulatory instruments can be e.g. bans, public procurement, product policies enhancing producer responsibility, requirements and standards (e.g. minimum recycled content) as well as targets. Economic instruments can be e.g. taxes on virgin raw materials or single use products, tax exemptions and reductions on reusable or repairable products and pay-as-you-throw schemes. Informative instruments inform and educate e.g. consumers by product labelling. Sitra (2014) points out the importance of granting financial support to development of circular economy technologies.

Circular economy indicators are a tool for measuring circular activities and their implementation and success. In China where circular economy has been implemented widely in practice, a set of circular economy indicators have also been established. China's circular economy indicators focus on the 3R principles: reduction, reuse and recycling, although they can be used to measure various other circular economy functions as well. Indicators are usually established by governments or decision-making bodies. (Geng et al. 2012)

### *Innovations and technological development*

Several sources identify technological development as a gateway to a successful circular economy (e.g. Ellen MacArthur Foundation 2012). Technological advancements and innovations are expected to support circular economy adoption practically and solve difficulties that prevent circular economy adoption such as material recovery challenges. Lazarevik and Valve (2017) mention the importance of the development of mobile applications and real-time data services in the success of circular business models as they allow the exchange of information among different entities to enable e.g. reuse, repair and recycling.

### *Life cycle assessment (LCA)*

LCA assesses the whole life cycle of a product or service to comprehend the environmental impacts that are associated with it. Conducting an LCA can help see where the main impacts are coming from and thus design them out. (Michelini et al. 2017, Pomponi & Moncaster 2017) LCA can be conducted by companies to improve circularity in their own operations but also by governments and legislative forces to plan policies and regulations for circular economy development (Zink & Geyer 2017).

## 2.1.5 Main feature groups identified in the literature

Some of the main features of circular economy presented in the previous chapter (see **Table 1**) are similar and overlap with each other. For the analysis of the data, the features were grouped into seven groups according to **Table 3**. On the left side are the main characteristic groups and on the right side are the characteristics that are combined to form the main characteristic groups. The seven main characteristics are used as a base in the data analysis.

1. Reuse	
2. Recycle	<ul style="list-style-type: none"> <li>• Recycle</li> <li>• Difference between technical and biological material flows</li> </ul>
3. Design	<ul style="list-style-type: none"> <li>• Design</li> <li>• Reduce</li> </ul>
4. Circular business and industrial models	<ul style="list-style-type: none"> <li>• Service orientation</li> <li>• Collaborative business and industrial models</li> <li>• Circular business models</li> </ul>
5. Supporting tools	<ul style="list-style-type: none"> <li>• LCA</li> <li>• Innovations and technological development</li> <li>• Policies and legislation</li> </ul>
6. Collaborative consumption	<ul style="list-style-type: none"> <li>• Collaborative consumption</li> <li>• Service orientation</li> <li>• Change in attitudes and values</li> </ul>
7. Renewable resources	<ul style="list-style-type: none"> <li>• Renewable materials</li> <li>• Renewable energy</li> <li>• Eliminating toxic chemicals</li> </ul>

**Table 3:** Main feature groups of a circular economy

The three first main feature groups of a circular economy, reuse, recycle, and designing, are described in chapter 2.1.4. The *recycling* characteristic is coupled up with differentiation between technical and biological material flows because the differentiation of these material flows is required in effective recycling. The dif-

ference between reuse and recycling is that in recycling raw materials are extracted or collected to produce a new product, while in reuse the product or waste as itself can be reutilised.

The *design* characteristic is combined with the reduction characteristic because designing out waste allows reduction to happen. There is no reduction of raw material input or efficiency without effective designing.

The fourth main characteristic, *circular business and industrial models*, includes several dimensions. Firstly, in a circular economy the emphasis is shifted away from more polluting sectors to less polluting ones. There will also be more demand for new innovations and technologies, which provide new business opportunities. Secondly, circular business and industrial models require collaboration between businesses and industries to ease material exchange and resource efficiency. Reverse supply chain functions are important in a circular economy as well because they ensure reuse of materials. Thirdly, circular business and industrial models are service oriented.

The fifth main characteristic, *support tools*, consist of practical tools that enable circular economy adoption. These are life cycle analysis (LCA), innovations and technological development, and policies and legislation. All are described in more detail in chapter 2.1.4.

The sixth cornerstone of circular economy is *collaborative consumption*, which is associated with service orientation and change in attitudes and values. Service orientation is a method of collaborative consumption. Change in attitudes and values is required for collaborative consumption to happen. Collaborative consumption methods can overlap with circular business and industrial models. The difference between these two is that collaborative consumption addresses the system from the consumers point of view.

The seventh and final cornerstone of circular economy is renewable resources. As described in chapter 2.1.4, a circular economy shifts towards using renewable materials, renewable energy and eliminates the use of toxic chemicals.

### **2.1.6 Difficulties of circular economy**

The difficulties circular economy faces are for example the complexity and difficulty to change an economic system in such a complete way. As Sitra (2016) points out, changing only parts of the economic system to be consistent with circular economy can cause so called rebound effects. Rebound effects of circular economy are discussed by Zink & Geyer (2017). For example, achieving resource efficiency can enable more production and material extraction to happen. Reuse models such as second-hand business may also increase the demand for new products. Increasing efficiency and as a result also price may increase consumption in sectors such as energy or transportation.

Other difficulties with circular economy presented by Sitra (2016) are transferring into circular economy may also be unprofitable in the short run. In pursuing a circular economy people must be educated on the matter and legislations must be corrected. Coherent policies and procedures must be agreed upon. Failing to do so might lead to failure of the concept.

### 2.1.7 Circular economy in Finland

Circular economy has gained a lot of interest in Finland and the government has set a target for Finland to be the leading country in circular economy globally by 2025 (Sitra 2016). Despite this, Finland is not performing as well in resource efficiency as the average EU country. However, Finland is investing the most in eco-innovation out of all the EU countries and is producing a lot of clean-tech solutions (Mickwitz, Seppälä, Kauppi & Hilden 2014).

Finland has the potential to develop a circular economy with its high-level education and technological expertise. Also, the fact that Finland is investing in eco-innovations and thriving in the clean-tech field will benefit its chances to succeed as a circular economy.

According to Sitra (2014 & 2016), circular economy would create a significant amount of high-education employment in Finland in the remanufacturing and recycling areas. It is an opportunity for Finland to increase the competitiveness of its economy. Sitra (2014 p.15) states that circular economy would increase competitiveness in the Finnish machine shop industry, as it is a large business area in Finland with features that could easily adopt circular economy thinking and processes such as new business models and service orientation. The paper industry could also benefit from circular economy by better utilising the whole tree, not only its fibres (Sitra 2014 p.28)

## 2.2 Power of media

### 2.2.1 Purpose of mass communication

According to Kunelius (2003 p.17), the purpose of mass communication or mass media is to distribute messages and information to an audience that is unlimited prior to distribution and is therefore public. Media channels, e.g. newspapers, TV and radio, are used as instruments to distribute the messages. Ikävalko (1995) supplements this definition by mentioning that the information distributed by media must be relevant and based on facts.

Bringing information to people in the society, media is seen as a tool to enhance equality. Because people base their decisions on the information they have received and the knowledge they have, media plays an important role in the achievement of democracy. When media is portraying information correctly and relevantly, people will get the right conception about current events and issues and will be able to make the right decisions. (Nieminen & Pantti 2004 p.11, Karppinen et al. 2015 p. 26)

Referring to Karppinen et al. (2015 p. 26), media plays a role in the achievement of human rights. They refer to the United Nation's declaration of human rights, where the UN member states commit to supporting freedom of speech,

the publicity of information and the rights of people to receive information. Media is seen as the body providing and spreading information to enhance the fulfilment of human rights.

### 2.2.2 Media in society

Media has a significant role in today's society. It is increasingly present in the lives of people and areas of society such as politics. Media forms a platform where different players in the society, e.g. politicians, organisations and companies, try to pursue their own agenda. Media is dependent on other actors in society and is in constant interaction with them. Media is a communication platform and has a profound influence on the direction of society. (Seppänen & Väliiveronen 2013 p.10-15; Kantola, Moring & Väliiveronen 1998 p. 5)

Media has an impact on discussion in society because it has the power to bringing up subjects of discussion and define how much attention and coverage they get. By bringing publicity to certain issues, it draws attention to these matters and gives visibility to their objectives. However, media rarely brings new themes into discussion. It is dependent on other actors in society and generally follows the discussion covered by them. (Seppänen & Väliiveronen 2013 p.170, 186; Nieminen & Pantti 2004 p.14)

Rather than viewing the media as an intermediary of information between different societal players and the public, Karvonen (1999) emphasises the benefit of seeing the media as an independent actor in society. As an independent actor media makes its own interpretations about information coming from various sources based on the knowledge it has acquired and for its own purposes. It often chooses the sources and shapes the information into its own interpretation of the matter. (Karvonen 1999 p. 79)

Media has long been considered to have an influence on people and various theories back this up. A traditional theory of media's effect on the themes of public discussion is called the *agenda-setting theory*. It originated from Water Lippmann's (1922) assessment in his book *Public Opinion* that the important topics of discussion of the public are determined by the media. Four decades after *Public Opinion* was published, the assessment was reassessed by Bernard Cohen (1963 p. 13): "*the press may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about.*" (Bell & McCombs 1996 p. 94-96)

The *agenda-setting theory* was first tested a few years later in 1972 by McCombs and Shaw in the Chapel Hill study on the American presidential election. The theory implies that mass communication has an agenda-setting impact on public discussion. Media agenda of discussion is linked to public agenda of discussion and therefore media sets the topics and themes of discussion in society. Even though the effect on attitudes and opinions is limited, media defines how much attention is to be paid and to which issues. It has the power to keep an issue or phenomenon entirely silent or to strengthen it. (McCombs 1977, McCombs & Shaw 1972)

### 2.2.3 Media as a creator of definitions and image

Seppänen and Väliverronen (2013 p.171) state research on media has been dominated by the understanding that media content will affect the attitudes, opinions and behaviour of its consumers. The responsibility of media is to present relevant information that is based on facts. It has a role on how people understand different issues and subjects by the way they are presented. It implicates on what issues are valued and what is the reality of society. It therefore has a significant impact on the general understanding of issues within society.

The earlier discussed agenda-setting theory implies that the issues covered in mass communication outlets are adopted by public discussion. *Attribute agenda-setting* assesses the attributes of these issues. It therefore takes a different viewpoint on agenda-setting. Apart from focusing on certain issues, the media can also focus on certain attributes of these issues and define which attributes are linked to which issues among the public. (Bell & McCombs 1996 p. 105-106, Spaulding et al. 2015)

By communicating certain attributes when discussing issues, the media *frames* the issues, which as Entman (1993 p.55) describes, refers to: “*calling attention to some aspects of reality while obscuring other elements, which might lead audiences to have different reactions.*” Framing forms a perception about an issue by selecting and elaborating certain attributes when describing it. This requires some attributes to be left out. *The framing theory* collides with the attribute agenda-setting theory as they both address the characteristics that are associated with issues among the media and the public. (Bell & McCombs 1996 p. 106)

Karvonen (1999) expresses the power of media in creating definitions by first presenting a simple model on how images are formed (see figure 4). The image about actor A is formed when information about actor A is intentionally or unintentionally distributed to actor B (the observer). Actor B forms a perception or image about actor A based on the information received. The perception is formed into the memory of the observer and is later used as a preconception on the subject. Media acts as a mediator of information between actors A and B, and creates *public perception* about actor A (see figure 5). Thus, observer B cannot directly observe actor A, but rather observes the features of actor A the media sees important to convey. The information about actor A is always compared and modified by previous perceptions about actor A in the mind of observer b to form an image on the subject. Cognitive science calls the image or perception formed a *scheme*. The scheme is influenced by the previous experiences and information acquired by the observer, as well as the culture surrounding that individual. (Karvonen 1999 p. 52-54, 61)

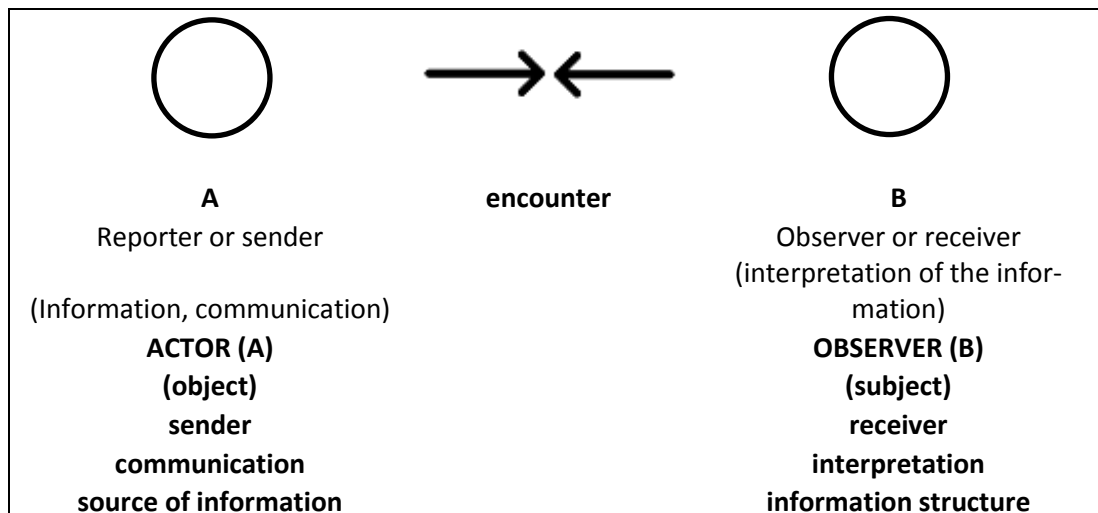


Figure 3: Forming of image (Karvonen 1999 p.52)

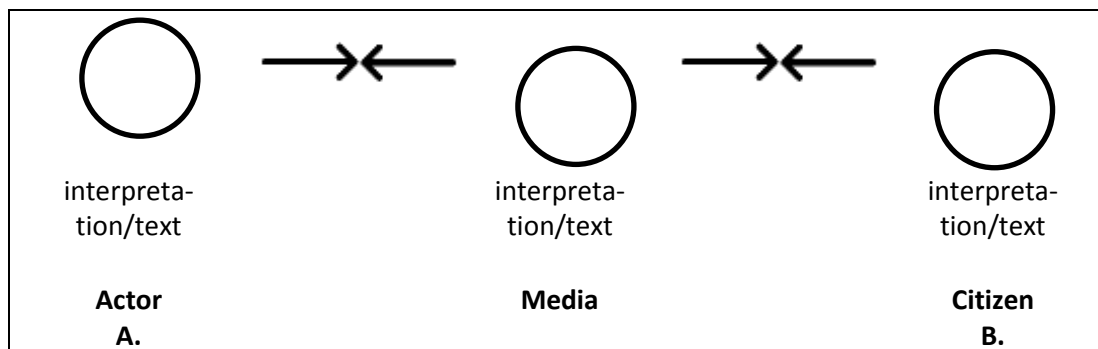


Figure 4: Forming of image based on media (Karvonen 1999 p. 78)

Media presents subjects in a certain way in its content, including and excluding what it sees fit. Issues are given certain focus, definitions and frameworks, which might not align with the definitions and frameworks given by other entities. Yet they shape the comprehension of the media consumer on the issues and themes discussed. (Curran 2002 p. 163-165)

The semiotic approach sees media as a producer of definitions in the messages it generates as media outputs. The message is not seen directly as the definition, but as a means of forming one (Fiske 1992 p. 69). Media may be the only source of information about some issues for many people (McCombs & Shaw 1972). Therefore, the power of media in creating definitions cannot be denied.

## 2.2.4 Medias influence on the perception of circular economy

Based on the research and knowledge of medias effect on definitions and image presented in the previous paragraphs, one can assume that media also has an influence on the definitions and image of circular economy by the way it is presented in the media outlets. Definitions given in the media for circular economy



can be assumed to affect the public perception of the concept. Circular economy is a broad concept covering many areas of the economy and requires a thorough systematic change. If the media gives a condensed perception of the concept and therefore the public forms a condensed perception of the concept, the whole potential is bypassed, and the success harmed.

## 3 DATA AND RESEARCH METHODS

### 3.1 Research design

Qualitative research commonly describes the data in a non-numeric way (Eskola & Suoranta 1998 p. 13). Quantitative research on the other hand aims at statistical generalisations. This paper takes a mixed method approach to the research questions. Qualitative content analysis is combined with quantifying the data to get a clear understanding of the interpretations of circular economy in the Finnish media. A qualitative research approach is essential because the aim is to understand in what kind of contexts is the term used and what kind of discussion revolves around it as well as what kinds of meanings are given to the term circular economy. The quantitative approach of quantifying the data is taken to support the qualitative approach.

Qualitative research analysis methods are divided by Eskola (2001) into three categories according to what role the theory plays in the analysis process: data-originated, theory-bound and theory-originated analysis (Tuomi & Sarajärvi 2002 p. 97-99). In data-originated analysis the analysis methods are selected according to the research questions from the data content. The problem with data-originated analysis is that the preconceptions of the researcher can easily have an influence on the results. In theory-bound research theory is used to help the analysis process even though the analysis methods are still derived from the data. Using theory to help the analysis can help with the problem of preconceptions of the researcher. (Tuomi & Sarajärvi 2002 p. 97-99)

This research uses the third analysis method: theory-originated analysis in which the theory is used as the basis of the analysis. The theoretical framework can be examined and tested in a new context, in this case the media context. In this research the theoretical information and knowledge about circular economy is used to analyse the data. A deductive approach is taken, where the definitions given in the theory to select the topics of interest in the analysis. (Tuomi & Sarajärvi 2002 p. 99-100)

### 3.2 Data collection

As the aim of this research is to describe how the term circular economy is interpreted in Finnish media, the focus is on the quality of the content of the data rather than in its quantity. In qualitative research it is important to find relevant and viable sources of data. (Tuomi & Sarajärvi 2002 p. 87-88) The relevant sources for this research are media outputs. They are therefore *secondary data*; they existed before the research and despite any actions done by the researcher. (Eriksson & Kovalainen 2008 p.77-78) Analysing media outputs is the most effective way to

find out how the concept of circular economy is comprehended in media because they are primary sources of information.

### 3.2.1 Data sources

There are many possible media outlets that could be used for this research e.g. newspapers, magazines, social media or Internet forums. The media outlet chosen for this research is newspapers. Wiio (2006 p. 21) states that newspapers are the most powerful media source in Finland. Newspapers reach wide amounts of people daily and they are easily accessible. Certain newspapers are a generally trusted source of information.

The newspapers selected for the data of this research is Helsingin Sanomat. It is the largest newspaper in Finland with a distribution rate of over 320 000 in 2015 (Media Audit Finland Oy 2015). Helsingin Sanomat is published daily and covers news topics widely in various areas. Although its readership is located mainly around the capital area, it reaches people widely around the nation. Other newspapers also use it as a source of information and it is cited often in different newspapers, which makes its indirect influence on society even bigger as its direct influence (Wiio 2006 p.22). Helsingin Sanomat offers printed and online versions of the newspaper but the content of the versions are the same. The data for this thesis was collected from the online archive of Helsingin Sanomat, which is available for subscribers.

### 3.2.2 Data collection methods

In qualitative research the aim is not to make statistical generalisations. Therefore, the quantity of data is not of primary importance and generally smaller amounts of data is needed than in quantitative research (Tuomi & Sarajärvi 2002 p. 87-88). Eskola & Suoranta (1998 p.61) talk about discretionary data gathering.

The aim in this research was to include 60 to 100 articles. The timeframe was set at 2015-2017 for the research to be as current as possible. A three-year timeframe provided enough data for the research and set a clear period with full years.

The search of Helsingin Sanomat was conducted during several days in 2017. The first search was conducted on March 22<sup>nd</sup>, 2017 and the last on Jan 2<sup>nd</sup>, 2018. The key word used for the search was "kiertotalou\*". *Kiertotalous* is the Finnish translation for circular economy. The search brought up all articles that included the word "kiertotalou\*" in the database. 173 hits appeared in total for the period of 2015-2017. The articles were reviewed and the articles covering circular economy and giving a definition for the concept were saved into one document to store them in one place so they can be easily analysed. 104 articles were eliminated in total because they did not include an understanding of circular economy and were therefore not useful for this research. The total amount of articles left to be used as data for the research was 69. **Table 4** presents the number of articles that appeared in the search during each year and the amount of articles that included a definition for circular economy and were selected to be used as

data. The Helsingin Sanomat articles that are used as data in this research are listed in **Table 5**.

Year	Total amount of hits	Applicable hits
2015	55	19
2016	52	20
2017	66	30

**Table 4:** Hits on Helsingin Sanomat article search

No.	Date	Section	Name of the article
1	20.1.2015	Pääkirjoitus	Rahapula on monikäyttöinen tekosyy leikkauksiin ja veronalennuksiin
2	18.4.2015	Pääkirjoitus	Saaristomeri voitaisiin pelastaa pilkkahinnalla - ratkaisu on kipsikäsittely
3	30.4.2015	Politiikka	Kokoomuksen vastaukset Sipilälle
4	30.5.2015	Raha	Porakonetta ei kannata enää omistaa - jakaminen on 2010-luvun megatrendi
5	1.6.2015	Mielipide	Lisää hevosia ja heinäpeltoja?
6	1.6.2015	Raha	Jakaminen on 2010-luvun megatrendi
7	2.6.2015	Mielipide	Biotalous on yksi Tekesin strateginen painopiste
8	24.6.2015	Pääkirjoitus	Suomi voisi olla kannattavan kiertotalouden uranuurtajia - riittääkö uskallus?
9	15.7.2015	Mielipide	Kiertotalous kaipaa arkipäiväistämistä
10	19.8.2015	Kotimaa	Vihreät haluavat eroon koulutusleikkauksista
11	24.8.2015	Pääkirjoitus	Jakamistalouden edut tulisi ottaa laajempaan käyttöön
12	1.9.2015	Talous	Kierrätyskuitu säästää luontoa vaate kerrallaan
13	3.9.2017	Mielipide	Ravinteiden kierto kasvattaisi Suomen taloutta
14	4.9.2015	Mielipide	Kiertotaloudesta tarvitaan enemmän tietoa
15	9.9.2015	Mielipide	Ravinnekierto edellyttää kannustimia
16	19.10.2015	Talous	Jätejätti Ekokem virittää kuntoaan - riihimäkeläistä jäteyhtiötä trimmataan pörssikelpoiseksi
17	25.10.2015	Mielipide	Kansallisperintöä ei voi uhrata lyhytnäköisesti
18	21.11.2015	Mielipide	Hallituksen suunnitelmat vaarantavat jätehuollon
19	1.12.2015	Mielipide	Hallituksen suunnitelmat mahdollistavat kiertotalouden
20	3.1.2016	Koti	Rakennusten lyhennetty elinkaari tulee kalliiksi - laskun maksaa omistaja
21	17.2.2016	Talous	Ekokem harkitsee listautumista Helsingin pörssiin
22	18.3.2016	Ihmiset	Vuoden 2016 tekstiilitaiteilija Pirjo Kääriäinen kehittää ympäristöystävällisiä materiaaleja
23	21.3.2016	Talous	Made in EU -merkintä on yhä harvinaisempi - Onko aika sammuttaa valot EU:n tehtaista?
24	4.4.2016	Mielipide	Verkostoja luovat yritykset menestyvät
25	16.4.2016	Talous	Ilkka Herlinin lannoiteyhtiö välittää mädätettä - "Olemme ravinteiden Tinder"
26	18.4.2016	Pääkirjoitus	Kiertotalous hyödyntää ympäristöä ja bisnestä
27	25.4.2016	Ulkomaat	Amsterdam kerää virtsaa juhlijoilta, jotta sen voisi käyttää lannoitteena

28	12.6.2016	Talous	Fortum yrittää löytää uutta liiketoimintaa sähkönsiirron sijaan
29	20.6.2016	Talous	Ekokem avasi kierrätyslaitoksen, joka jalostaa ja erottelee jätteet - "Megatrendit ovat puolellamme"
30	15.7.2016	Mielipide	Sääntelyä on pyritty keventämään
31	28.8.2016	Mielipide	Tekstiilijätteen hyötykäyttöön haetaan uusia tapoja
32	29.8.2016	Pääkirjoitus	Pajuviljelmät nielevät hiiltä ja lisäävät humusta
33	21.9.2016	Pääkirjoitus	Tavarat kiertoon - kestävästi
34	3.10.2016	Talous	Tänä jouluna kinkunrasvat voi viedä kierrätykseen - niistä syntyy uusiutuvaa dieseliä hyväntekeväisyyteen
35	7.11.2016	Talous	Kolmevuotiaana Paula Salastie oli tulla kääriytyksi muovikelmuun perheen maalitehtaalla - nyt konsernihoitajana hän haluaa kasvattaa Teknosta yhtä voimakkaasti kuin isänsä
36	7.11.2016	Talous	VTT esitteli kiertotaloutta käytännössä: autoa ja porakonetta ei enää omisteta, varaosat 3 D-tulostetaan ja ruokahävikin proteiini otetaan talteen
37	22.11.2016	Mielipide	Kestovaippoja ei pitäisi poistaa äitiyspakkauksesta
38	21.12.2016	Ruoka	Joulukinkun paistaminen voi mennä monella tavalla pieleen - HS:n tiedetoimitus selvitti, miten saat kinkusta mehevän
39	28.12.2016	Mielipide	Kierrätystä kehitetään kuuntelemalla asukkaita
40	23.2.2017	Talous	Stockmann aloittaa merkkivaatteiden kierrätyskaupan helmikuun loppuun mennessä
41	18.3.2017	Politiikka	Antti Rinna paljastaa, miksi hän puhui olemattomasta kalankasvattamosta - Mutta selviääkö hän tiukasta tuijotuskisasta? Katso HSTV:n keskusteluohjelma Studio Kulmapöytä
42	1.4.2017	Talous	Ostaisitko eurolla naapurisi lihapullat? Ylijäämäruokaa voi kohta ostaa uuden sovelluksen avulla
43	18.4.2017	Pääkirjoitus	Kiertotalous kaipaa käytännön toimia
44	22.4.2017	Mielipide	Kiertotalouden edistäminen vaatii fiksua sääntelyä ja tehokkaita ohjauskeinoja
45	22.4.2017	Mielipide	Teknologiatoiminnassa kiertotalous on jo pitkällä
46	22.4.2017	Mielipide	Suomi ei ole vielä myöhästynyt junasta
47	20.5.2017	Elämä	Kauppatieteiden opiskelija havahtui turhanpäiväiseen kulutukseensa ja alkoi vältellä kaikkea muoviin pakattua - nyt hän tekee jopa deodoranttinsa itse
48	2.6.2017	Auto	Miksi tietyn Volvon osa ei toimi toisessa Volvossa? Koska autoteollisuus estää osien uudelleenkäytön koodikikkailulla, sanoo Autopurkamoliitto
49	7.6.2017	Talous	Koko maailmantalous perustui pitkään velheelle, uskoo YK:n kehitysohjelman johtaja - "Meillä on edessämme järjestyttävä muutos"
50	8.6.2017	Auto	Miksi autojen moottorit kestävät nykyään vähemmän kilometrejä? Koska autonvalmistajat pyrkivät "riittäväan, mutta eivät liian hyvään" moottoriin
51	2.7.2017	Pääkirjoitus	Jätteet kannattaa kierrättää kesän festareillakin, sillä suomalaisilla on vielä paljon parantamisen varaa
52	12.7.2017	Mielipide	HSY haluaa nostaa

53	13.7.2017	Pääkirjoitus	Yritin antaa lasten pinnasängyn ilmaiseksi Facebookin kierrätysryhmässä - helpommaksi osoittautui pilkkoa se hellapuiksi
54	17.7.2017	Talous	Onnibussin perustaja mullisti Suomen bussiliikenteen ja suututti vanhat tekijät - seuraavaksi pitäisi valloittaa maailma
55	20.7.2017	Ulkomaat	Nyt se on laskettu: maailmassa on tuotettu 8,3 miljardia tonnia muovia ja peräti puolet siitä kolmentoista viime vuoden aikana - silti tuotanko vain lisääntyy entisestään
56	29.7.2017	Mielipide	Kiertotalous vähentää liikenteen päästöjä
57	12.8.2017	Politiikka	Jo Kimmo Tiilikaisen naamasta näkee, mitä hän ajattelee ministerien uudesta salkkujaosta - uusi titteli auttaa vastaamaan ilmastonmuutokseen
58	13.8.2017	Ulkomaat	Nämä yhdeksän megatrendiä muuttavat maailmaa vuonna 2018 - Mistä aiheesta sinä haluaisit HS:n uuden kirjeenvaihtajan kirjoittavan
59	20.8.2017	Kaupunki	Helsinkiläinen t-paita saattaa päätyä saksalaisen auton sisäkattoon - kierrätysfirma Recci tekee lumpuilla bisnestä
60	4.9.2017	Päivän lehti	Poistotekstiilit ovat arvokasta materiaalia
61	14.9.2017	Ruoka	Ei roskikseen vaan ravintolaan - Ruokahävikki kiinnostaa jo muitakin kuin maailmanparantajia
62	19.9.2017	Talous	Keinokuituvaatteet tuhoavat meriä ja voivat vaarantaa ihmisten terveyden, mutta moni ei tiedä sitä - "Fleece on erityisen haitallista"
63	9.10.2017	Mielipide	Jätelain muutokselle ei ole yleistä perustetta
64	18.10.2017	Talous	Äänekoskella vihittiin Suomen metsäteollisuuden uusi ylpeys: 12 Eduskuntatalon kokoinen sellutehdas
65	6.11.2017	Pääkirjoitus	Ravinteiden kiertoa pitää tehostaa
66	18.11.2017	Elämä	Suvi Haimi kypsyi muovijätteen määrään kylpyhuoneessaan - syntyi urauurtava keksintö, joka kiinnostaa jo kansainvälisiä kosmetiikkabrändejä
67	1.12.2017	Kaupunki	Ympäristöaktiivi loysi illan pimeydestä vaahtoa pulputtavan ojan Vantaalta - "Kuvasin kaiken videolle, koska meitä asukkaita ei haluta uskoa"
68	14.12.2017	Ulkomaat	YK:lta hätkähdyttävä tutkimus: Maailmassa heitettiin 45 miljoonaa tonnia elektroniikkaromua menemään viime vuonna - pelkästään suomalaisten tuottama jäte painaa 18 Eduskuntatalon verran
69	20.12.2017	Kaupunki	Vantaan vaahtoavassa ojassa pieniä haitta-aine pitoisuuksia - paha haju syntyi mädäntyneestä kasvillisuudesta

**Table 5:** List of Helsingin Sanomat articles

### 3.3 Analysis process

#### 3.3.1 Content analysis overview

The data analysis method chosen for this research is content analysis. It is a method for analysing qualitative data systematically. It is used for organising, summarising and bringing clearance to the data. It can be used to analyse many kinds of documents in different forms e.g. books, articles, journals and interviews. The objectives of content analysis serve the aims of this research as the purpose of this analysis is to form an understanding of how the term circular economy is understood in the Finnish media. (Tuomi & Sarajärvi 2002 p.105, 110)

Krippendorff (2004 p.18) describes content analysis as “a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use.” According to Krippendorff (2004 p.45, 49-53) it can be used to exploit trends, patterns, similarities and differences in the data but also to test hypothesis and to confirm beliefs. Tuomi and Sarajärvi (2002 p.94, 105-106) point out that content analysis is effective in categorising qualitative data and finding themes and meanings within the data.

Content analysis is a common method that can be used widely in qualitative research. In fact, it is in one shape or another used in most qualitative research. It can be used as a loose theoretical framework where different analysis methods are used to form an entity or as a single analysis method. (Tuomi & Sarajärvi 2002 p.93)

The steps of conducting a qualitative analysis are presented by Tuomi and Sarajärvi (2002 p. 94) and are shown in **Table 6**. These steps were also used in conducting the analysis in this research.

Steps for conducting a qualitative analysis
1. Selecting topics of interest in the data and stick to them
2. Reviewing the data and marking the topics of interests selected
3. Categorise, thematise and typologise (according to topics of interest)
4. Write a conclusion

**Table 6:** Steps for conducting qualitative analysis (Tuomi & Sarajärvi 2002 p. 94)

It is important to select the topics of interest in the data before analysing it. Setting clear research questions assists in this. When conducting the analysis, the researcher can focus on the set topics of interest and not cling to every interesting topic that arises. The research questions of this research are defined in chapter 2. (Tuomi & Sarajärvi 2002 p.94, Krippendorff 2004 p.32)

Step three is conducted according to the theoretical framework as this research takes a theory-originated research perspective. Step three is often seen as conducting the actual analysis, although the third step could not be completed without the first two. Classification methods in step 3 are presented by Tuomi

and Sarajärvi (2002 p.95-96) as categorising, thematising and typologising. Categorising includes setting categories and counting the amount of times that each category appears in the data. Thematising brings up themes that give solutions to the research problems and the focus is more on the content of how the theme is brought up and what is said about the theme. Typologising on the other hand includes dividing the data according to what types of views or solutions are given to the topics of interest. It is very similar to thematising but focuses more on the similarities of solutions brought up by the data. (Eskola & Suoranta 1998 p. 165-182, Tuomi & Sarajärvi 2002 p. 95)

The content analysis in this research takes a deductive approach, which means it relies on the theory to form topics of interest in the data and is therefore theory-originated. Data-oriented and theory-oriented content analysis methods differ from each other as the theory plays a different role in them. Data-oriented analysis usually simplifies and groups the data, after which theoretical concepts are formed from the data. (Tuomi & Sarajärvi 2002 p.110-111)

#### *Theory-originated content analysis overview*

According to Sarajärvi & Janhonen (2000), a theory-originated analysis starts with forming an analysis framework (cited by Tuomi & Sarajärvi 2002 p.116). The framework categorises the data and brings up the bits of data that fit into the framework and shows what is left outside. The data that is left outside can be used to form their own categories as an unstructured analysis or the analysis can only focus on collecting the data that is inside the framework as a structured analysis. An example of an analysis framework that can be used in a theory-originated content analysis is illustrated roughly in **Table 7**. (Tuomi & Sarajärvi 2002 p. 116-117)

The characteristics and dimensions of the phenomenon are systematically selected from the theory and placed into the framework. In other words, the data is categorised into the framework. The x's in **Table 7** are the pieced of data that describe the phenomenon with the selected characteristics or dimensions.

Dimensions of the phenomenon / Characteristics of the phenomenon			
	x	x	x
	x	x	x

**Table 7:** Example of a content analysis framework (Tuomi & Sarajärvi 2002 p. 116)

The next step in conducting a theory-originated analysis can be to *quantify* the data. This is a possible next step for the analysis framework, but is not mandatory. Quantifying gives numeral meanings to the data by calculating how many times characteristics and dimensions given in the theory define the data. The frequencies presented by quantifying give another viewpoint to the analysis process. Quantifying supports the qualitative analysis and gives it a quantitative aspect.



(Tuomi & Sarajärvi 2002 p.117-119, Eskola & Suoranta 1998 p.165-166, Saunders et al. 2012 p.563)

An example of quantifying data is shown in **Table 8**. The figure illustrates how different theoretical sources give different characteristics to a phenomenon. The x's mark which characteristics are associated with the phenomenon by which source and the number of sources using each characteristic is calculated at the bottom. The numbers at the bottom are frequencies that describe the data.

Sources / Characteristics of the phenomenon	Characteristic 1	Characteristic 2	Characteristic 3
Source 1		x	x
Source 2	x		x
Source 3		x	
Source 4	x		x
Source 5			x
<b>Total</b>	2	2	4

**Table 8:** Example of quantifying data

To ease the analysis process and avoid inconsistencies, it is important to plan rules and criteria for the classification of the data into the framework. Eskola & Suoranta (1998 p.167-168) also point out the importance of selecting the right dimensions and characteristics into the framework. It is difficult to select the right amount of characteristics as too many may lead to very few x's in each category, while too few of them may lead to important points missed.

### 3.3.2 Content analysis in this research

#### Content analysis topics

1. Academic features of circular economy appearance in the media data
2. Academic features of circular economy appearing in the media data during different years
3. Academic features of circular economy appearing in different sections of the newspaper

**Table 9:** Content analysis topics

The content analysis in this research was done according to the steps presented in **Table 9**. The first step was to select the topics of interest in the data. Because this content analysis took a theory-originated approach, the topics of interests in the data were specified according to the theoretical framework. This meant that

the main characteristics in the theory needed to be specified before proceeding with the actual analysis of the data.

The academic sources were analysed to see what definitions to the circular economy concept were given in the theory. A content analysis framework was created to analyse the theory and is presented in **Appendix 1**. The different academic sources were listed in the left side bar and the different attributes of circular economy were listed in the top bar of the framework. The framework showed which different attributes of circular economy were mentioned by which academic source. The framework was also quantified according to **Table 8**, so that it became apparent which attributes were the most frequent. The most frequent attributes of circular economy identified in the literature were the topics of interest in the data analysis and the topics of interest in step one of **Table 6**. The main attributes of circular economy identified in the literature can be seen in **Table 1** and are presented in chapter 2.1.4 of this paper.

Because there were so many attributes to circular economy identified in the research literature and some of them were similar and overlapping with each other, seven main feature groups were formed. Features that were similar and overlapping with each other were combined into the same group. These main feature groups are presented in **Table 3** and were used as a basis for the analysis.

The next step, after defining the main feature groups of circular economy in the literature, was to review the data according to the feature groups. A content analysis framework was created with the data sources on one side bar and the main feature groups of circular economy defined in the literature on the top bar. This framework shows how frequently each main attribute defined in the academic sources appears in the data, which attributes are most common and most rare.

The second analysis framework uses the feature groups of circular economy and compares them to the year that the newspaper article was published. This framework helps in analysing whether the features associated with circular economy have changed during the years. The academic characteristics of circular economy are listed in the left column of the analysis framework and the years are listed in the top column. The number of newspaper articles that include each definition during the particular year is filled into the framework.

The third analysis framework examines the use of academic features of circular economy in each section of the newspaper. The main features of circular economy identified in the literature are listed in the left column of the framework and the newspaper sections are listed in the top column of the framework. The number of articles containing each feature in each newspaper section is filled into the framework.

## 4 RESEARCH FINDINGS

This chapter presents the findings of the analysis. The quantitative research findings are presented first. Each content analysis framework is presented and analysed under its own subheading. Figures and tables are used to illustrate the analysis findings and to present them in a clearer way. The qualitative findings are presented in the second part of this chapter.

### 4.1 Quantitative findings

#### 4.1.1 Appearance of academic features for circular economy in the media data

The first content analysis framework analyses the how frequently each academic feature of circular economy is found in the media data. The article number was placed in the left column of the framework and each main characteristic of circular economy identified in the academic literature was placed in the top column of the framework. The x's in the framework show which characteristics are identified in which media article. The total number of each characteristic and the percentage compared to the total amount of media articles is given at the bottom of the framework.

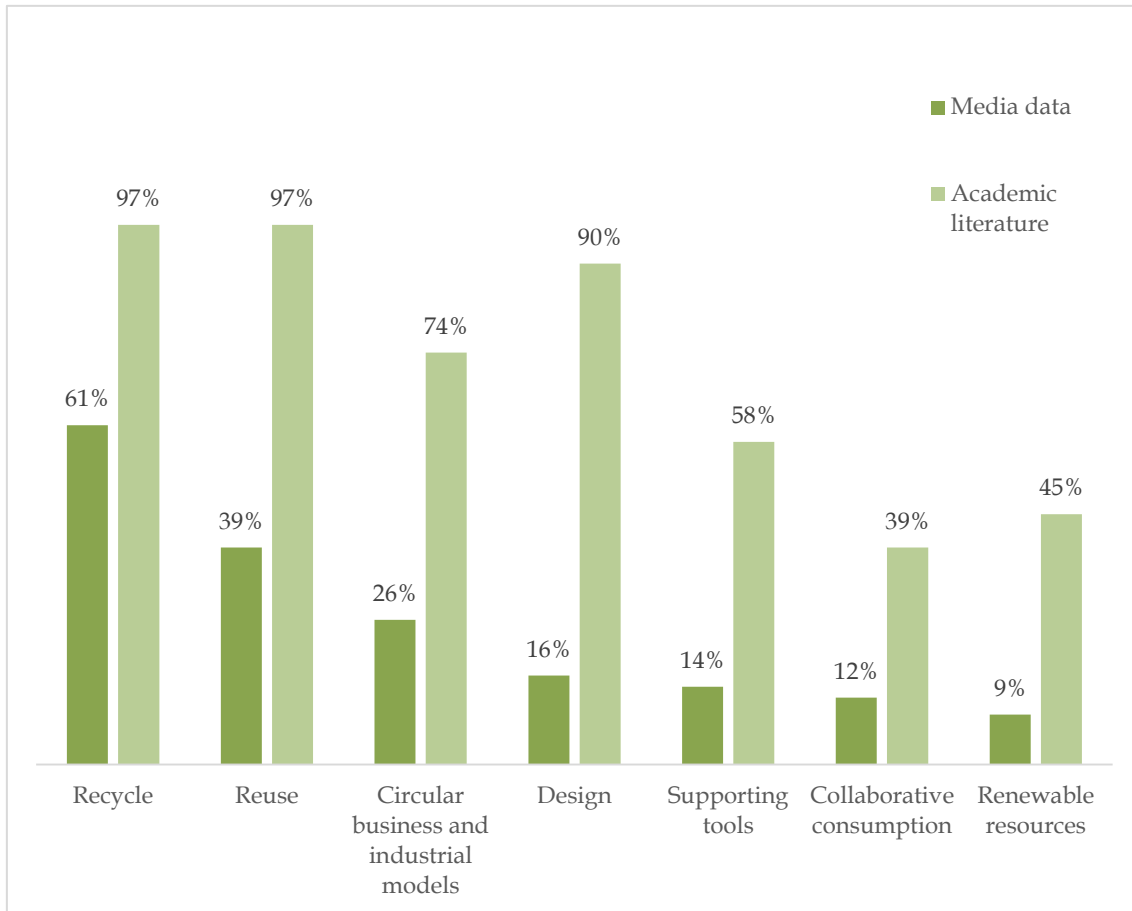
Article number / academic feature	Reuse	Recycle	Design	Circular business and industrial models	Supporting tools	Collaborative consumption	Renewable resources
1.			x				
2.	x			x			
3.	x	x			x		x
4.						x	
5.							x
6.						x	
7.				x			
8.	x	x	x	x			x
9.	x	x	x	x	x		
10.		x					

11.					x	x	
12.	x					x	
13.		x		x	x		
14.		x					
15.		x			x		
16.		x					
17.		x					
18.		x					
19.		x					
20.	x						
21.	x	x					
22.			x				
23.	x						
24.	x	x		x			
25.		x					
26.	x	x					
27.	x						
28.		x					
29.		x	x	x			
30.					x		
31.	x			x			
32.		x					
33.	x	x	x			x	
34.	x			x			
35.		x					
36.		x		x	x		
37.	x						
38.	x						
39.		x					
40.	x			x			
41.	x						
42.		x					
43.	x	x	x	x	x	x	
44.				x	x		
45.	x	x	x	x			
46.	x	x	x	x			
47.		x					
48.	x						
49.		x		x			
50.		x					
51.		x			x	x	
52.		x					

53.	x	x					
54.	x			x			
55.		x					
56.		x					x
57.						x	
58.		x	x	x			
59.	x	x					
60.	x						
61.	x						
63.		x					
64.		x					
65.							x
66.		x	x				
67.							x
68.		x					
69.		x					
70.		x					
	27 39%	42 61%	11 16%	18 26%	10 14%	8 12%	6 9%

**Table 10:** Analysis framework 1

The results of the first content analysis are presented from most frequent to least frequent in percentages in **Figure 5**. The analysis reveals that the most frequent characteristic given to circular economy in the Helsingin Sanomat articles from the year 2015 to 2017 was recycling. 42 out of the 69 articles (61%) associated circular economy with recycling. The second most frequent characteristic is reuse. 27 articles (39%) associated circular economy with reuse. The third most frequent characteristic is circular business and industrial models with 18 (26%) media articles. The design characteristic was associated with circular economy in 11 (16%) media articles and supporting tools characteristics was associated with circular economy in 10 (14%) media articles. 8 (12%) media articles associated circular economy with collaborative consumption and 6 (9%) media articles identified circular economy with renewable resource use.



**Figure 5:** Academic characteristics in the media data and in the academic literature

**Figure 5** also shows the appearance of the academic feature groups for circular economy described in chapter 2.1.5 in the academic literature. The academic literature percentage is the highest percentage of the features that are combined into each main characteristic group. The appearance of each characteristic can be seen in the theory analysis framework in **Appendix 1**. **Figure 5** allows the comparison of the appearance of academic feature groups in the academic literature and in the media data.

Overall the appearance of each main characteristic was more frequent in the academic literature than in the media data. The differences of the appearance of each characteristic in the media data and in the academic literature are larger concerning some features. The differences are calculated into **Table 11**. The design characteristic has the largest difference, 74%, between the frequency of appearance in the data and in the academic literature. The second largest difference, 58%, is concerning the reuse characteristic. The circular business and industrial models- characteristic in the media data has the third largest difference, 48%, compared to the academic literature. The difference concerning the supporting tools characteristic is 44%, the recycle characteristic is 36%, the renewable resources characteristic is 31% and the collaborative consumption characteristic is 27%.

The differences of the frequency of each characteristic in the media data and the academic literature reveal how differently the concept of circular economy is described in the Finnish media compared to academic sources.

Academic feature	Media data	Academic literature	Difference
Recycle	61%	97%	36%
Reuse	39%	97%	58%
Circular business and industrial models	26%	74%	48%
Design	16%	90%	74%
Supporting tools	14%	58%	44%
Collaborative consumption	12%	39%	27%
Renewable resources	9%	40%	31%

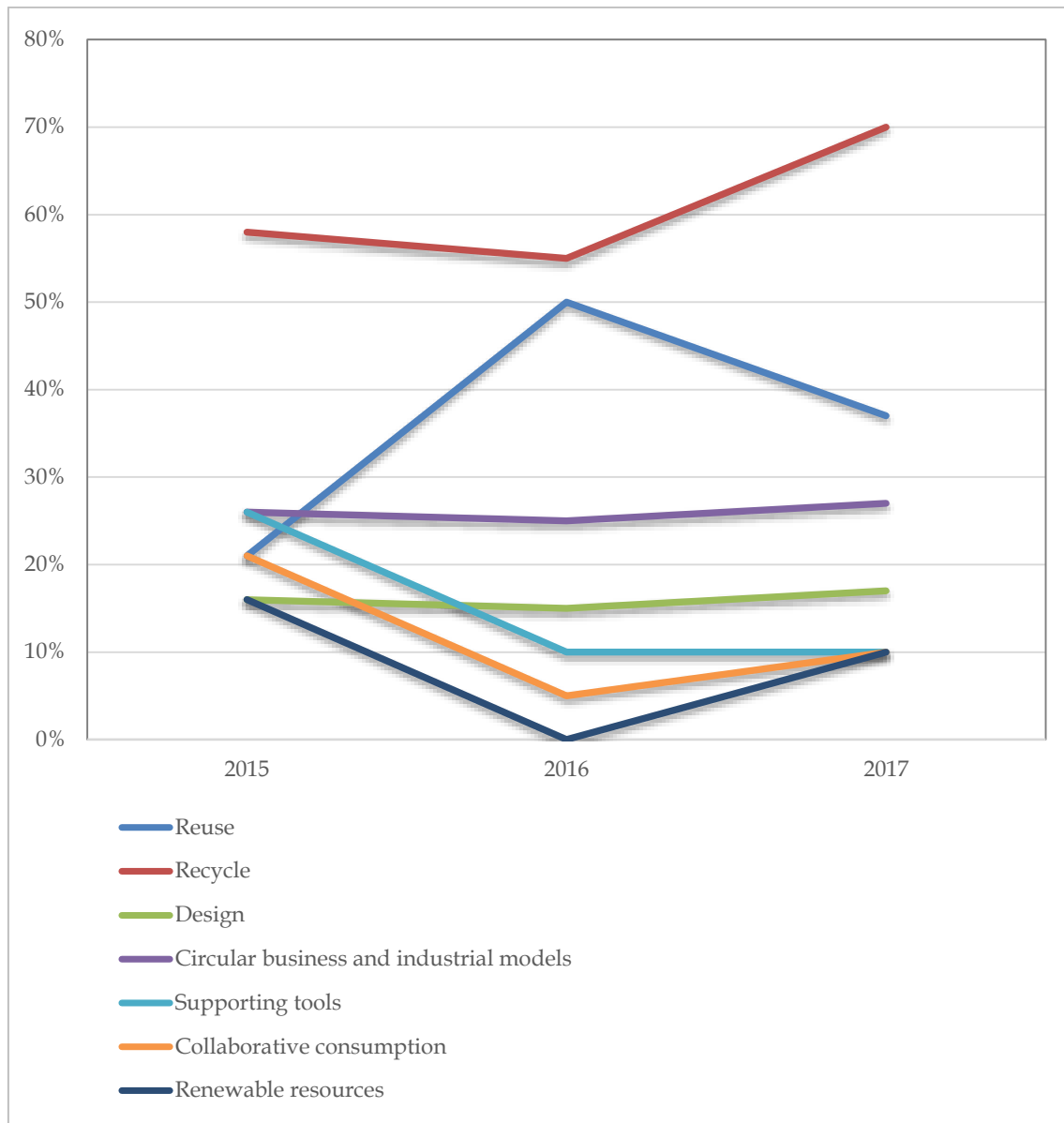
**Table 11:** Difference between frequency of academic characteristics in the media data and in the academic literature

#### 4.1.2 Appearance of academic features for circular economy in the media data during different years

Publication year / academic feature	Reuse	Recycle	Design	Circular business and industrial models	Supporting tools	Collaborative consumption	Renewable resources	Total amount of articles
2015 (Articles 1-19)	5 (21%)	11 (58%)	3 (16%)	5 (26%)	5 (26%)	4 (21%)	3 (16%)	19
2016 (Articles 20-39)	10 (50%)	11 (55%)	3 (15%)	5 (25%)	2 (10%)	1 (5%)	0 (0%)	20
2017 (Articles 40-69)	11 (37%)	21 (70%)	5 (17%)	8 (27%)	3 (10%)	3 (10%)	3 (10%)	30

**Table 12:** Analysis framework 2

The second analysis framework analyzing the occurrence of academic features for circular economy during different years is presented in **Table 12**. Each horizontal row presents the appearance of each feature during that year. As each year includes a different amount of media articles, the percental amount of media articles including each feature is also presented. **Error! Reference source not found.** illustrates how the percental appearance of each feature has changed during the three-year period.



**Figure 6:** Academic characteristics in the media data during different years

The analysis shows that the percental appearance of the recycling feature decreased slightly from 58% to 55% during the first year but increased to 70% from 2016 to 2017. The percental appearance of the reuse attribute grew from 21% in 2015 to 50% in 2016 but decreased to 37% in 2017. Circular business and industrial models were associated with circular economy in 26% of the media articles in 2015, in 25% in 2016 and in 27% in 2017. The use of the design feature also remained steady during the three years; it decreased slightly from 16% in 2015 to 15% in 2016 and then increased to 17% in 2017. The use of the supporting tools feature decreased from 26% in 2015 to 10% in 2016 and staid at 10% in 2017. The use of collaborative consumption decreased from 26% in 2015 to 5% in 2016 and increased to 10% in 2017. Finally, the use of renewable resources as a feature for circular economy decreased from 16% in 2015 to 0% in 2016 and increased to 10%



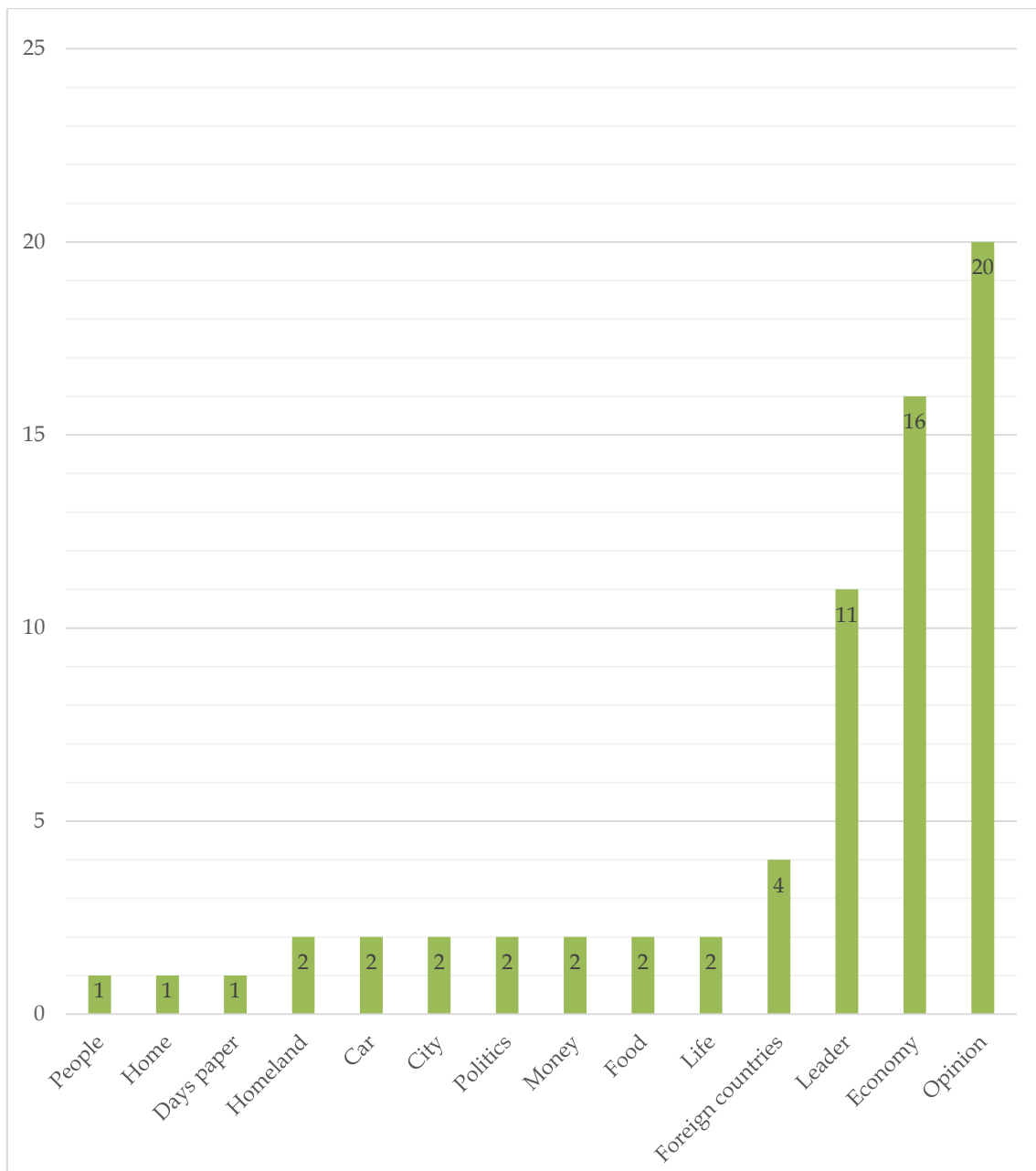
in 2017. The total amount of articles including a definition for circular economy grew from 19 media articles in 2015 to 20 media articles in 2016 and to 30 media articles in 2017.

#### 4.1.3 Appearance of academic features for circular economy in different sections of the newspaper

Newspaper section / Academic feature	Reuse	Recycle	Design	Circular business and industrial models	Supporting tools	Collaborative consumption	Renewable resources	Total amount of articles
Auto <i>Car</i>	1 50%	1 50%						2
Elämä <i>Life</i>		1 50%					1 50%	2
Ihmiset <i>People</i>			1 100%					1
Kaupunki <i>City</i>	1 50%	2 100%						2
Koti <i>Home</i>	1 100%							1
Kotimaa <i>Homeland</i>		2 100%						2
Mielipide <i>Opinion</i>	6 30%	14 70%	3 15%	8 40%	5 25%		2 10%	20
Politiikka <i>Politics</i>	1 50%					1 50%		2
Päivän lehti <i>Days paper</i>	1 100%							1
Pääkirjoitus <i>Leader</i>	6 55%	8 73%	5 45%	3 27%	3 27%	4 36%	1 9%	11
Raha <i>Money</i>						2 100%		2
Ruoka <i>Food</i>	2 100%							2
Talous <i>Economy</i>	6 38%	10 63%	1 6%	6 38%	1 6%	1 6%	1 6%	16
Ulkomaat <i>Foreign countries</i>	1 25%	3 75%	1 25%	1 25%				4

Table 13: Analysis framework 3

The third analysis framework is presented in **Table 13**. The total amount of media articles in each newspaper section is presented in the right-side column. The name of the newspaper sections are translated into English in the left-side column. The number of articles in each newspaper section with different characteristics of circular economy is filled into the framework. The percental amounts of each feature compared to the total amount of articles in that newspaper section are also filled into the framework because each newspaper section had different amounts of articles that include a definition for circular economy. The distribution of the articles included in the media data between different newspaper sections is illustrated in **Figure 7**.



**Figure 7:** The distribution of the media data between different newspaper sections

The analysis shows that the newspaper sections with remarkably more articles than the rest are the opinion section with 20 articles, economy section with 16 articles and leader section with 11 articles. The rest of the sections have only one or two articles.

The opinion section is a bulletin board where the public can write texts with their own comments and opinions about a matter. Texts on relevant and current societal matters are published in the section (Helsingin Sanomat n.d.). The authors of the texts published in the opinion section are often but not consistently specialists on the topics. The authors of the articles in this section are not journalists, unlike in the other sections. Thus, the analysis results indicate that the public plays a significant role in the discussion about circular economy and therefore are an important player in defining the concept in the Helsingin Sanomat newspaper. This conclusion can be made based on the fact that 29% of the articles containing a definition of circular economy have been published in the opinion section of the newspaper.

23% of the articles in the media data were published in the economy section of Helsingin Sanomat, which is also the section containing second most articles with a definition for circular economy during the years 2015 to 2017. This implies that the discussion of economic issues is a significant platform for discussion on circular economy. This aligns with the theoretical framework, where circular economy is presented mainly as an economic model.

16% of the media articles containing a definition for circular economy in Helsingin Sanomat during the years 2015 to 2017 were leaders. A leader is an article on the leading page of a newspaper that discusses a current issue and expresses the newspaper's position or view on that subject. Therefore, a leader is also an opinionated text. A leader can assess a phenomenon regarding any kind of topic or field. (University of Jyväskylä Language Centre n.d.)

Articles in the opinion section as well as leader articles are opinionated texts. Together the articles containing definitions for circular economy in these two sections consist 44% of the media data in the research. Thus, the analysis reveals that opinionated texts provide a significant platform for circular economy discussion in Helsingin Sanomat.

The rest of the media articles are spread quite evenly among the rest of the newspaper sections with one to four articles in each section. The amount of articles in each remaining section is so small that significant conclusions are difficult to make.

## 4.2 Qualitative findings

### 4.2.1 Reuse

The reuse feature of circular economy appears in Helsingin Sanomat as multiple ways to redistribute, repair and utilize products that would otherwise be disposed. Several real-life examples are given of practices that contribute to the reuse of products.

Circular economy is defined as “making new products of matter that would usually be dumped in the landfill” (media article 23). Repairing, maintenance, redistribution and reutilization of products in other uses than what they were originally created for are all ways of reuse identified in the media data. Concrete examples of redistribution discussed in the articles are Stockmann’s new business activity in selling secondhand clothing, Facebook flea markets and giveaway groups. Reutilisation examples identified in the media data are for example collecting urine of festivalgoers and utilizing it as fertilizer, collecting grease of Christmas ham during the holiday season and using it as raw material for biofuel as well as utilizing used clothes in the automotive industry as material for car ceilings.

The reusability of car parts is discussed in article 48. A trend in the automotive industry of making car parts “good enough” but not “too good” for the customers to buy more and the business to be profitable is discussed. In the spirit of circular economy these kinds of practices should be eliminated according to the article. Products and parts should be made to last and to be able to be reused for as long as possible. Cloth diaper usage is also brought up in article 37 as a circular economy consistent practice.

Utilisation of construction of old buildings is discussed in article 20. For enhancing circular economy, the constructions of e.g. old office buildings should be utilised more efficiently to build loft apartments instead of deconstructing the whole building from the way of a new one.

In the Helsingin Sanomat articles, reuse practices, such as redistribution, were often referred to as recycling. For example, in article 53 Facebook flea markets and giveaway groups are referred to as recycling, although according to the definition given to this kind of practices in the academic literature is usually reuse. Because the materials are not extracted from the products and used as raw material, it cannot be classified as recycling according to the academic literature.

Reuse methods that were described in the academic literature were all not covered in Helsingin Sanomat. Remanufacturing and refurbishing were not covered in any of the articles.

### 4.2.2 Recycle

The recycling feature of circular economy is discussed in the media data by presenting best practices for the development of a circular economy. Increasing the

recycling rate is identified as a key step towards a circular economy (media articles 3 and 52). Materials that are recyclable are not to be burned as waste (media article 10). Recycling is seen as the most important way of the implementation of circular economy in Finland so far (media article 8).

The discussion on recycling as a part of a circular economy occurs partially in discussion about waste management practices in Finland and the direction of government and EU policies and legislation on these issues (media articles 9, 18, and 19). Other discussion revolves around industries that are important in increasing recycling rates such as the automotive industry (media article 50), the textile industry (media articles 12, 22, 59, 60 and 62) and the food industry (media articles 42, 61 and 43). The possibilities of producing recycled fiber from recycled textiles and plastic is discussed in several articles (media articles 12, 22 and 63). Services that decrease food waste by distributing recyclable food such as mobile apps like ResQ Club and Lunchie are also discussed in several articles (media articles 61, 43 and 42). A couple of articles discuss the small recycling rate of electronics in Finland (media articles 68 and 69).

Several articles discuss the recycling of nutrients (media articles 14, 15, 25, 26 and 65), which is seen as an important issue in a circular economy. Nutrient recycling is also a part of the EU Commission's circular economy plan (media article 26). By developing effective nutrient recycling, Finland and the EU could operate as forerunners in circular economy (media article 26). In the core of nutrient recycling are phosphorous and nitrogen, which are used largely in food production (media articles 14, 15 and 65). Recycling nutrients would decrease the need for fertilizers that require unrenowable energy and finite phosphorous reserves (media article 66).

Ekokem, a Finnish company bought recently by the large Energy producer Fortum Oyj, is the subject of several media articles discussing recycling as a part of circular economy (media articles 16, 21, 28 and 29). It is perceived in Helsingin Sanomat as a *circular economy company* because of its operations in recycling. Ekokem has built a *circular economy village* in Riihimäki, where waste is sorted, biogas is made out of bio-waste, plastic hails are made out of plastic waste that can be used to produce new plastic, metal is collected, and the rest is burned (16). According to Pantsar in media article 29, Ekokem represents current circular economy operations because current companies make products that need to be recycled. The *circular economy village* sorts through waste mechanically, which would otherwise have been burned (media article 29). Also other concentration areas of companies operating in recycling are called circular economy hubs in the data (media article 67).

### 4.2.3 Design

The importance of the design phase of products and services in a circular economy is emphasized in the media data. As is said in article 8, "The goal is to design the whole economy so that no waste is generated: the waste of one production plant is the raw material of another." Biofuels are presented as an example of this kind of development where waste is used as raw material. Article 9 states: "80

per cent of the environmental impacts of a product arises on the designing table. In a circular economy, products are designed to be durable and reusable...". Article 33 mentions: "Recycling, reuse and production are considered already in product development." The importance of the design phase is comprehended very similarly in the media data as in the research literature. Article 29 emphasizes the importance of choosing the right materials in the design phase for the product. The materials are to last as long as possible in use and stay in the loop.

The difference between the design principle in the media data and in the academic literature is that cleaner production methods and eco-design are not discussed in Helsingin Sanomat as a part of designing out waste in a circular economy as they were in the research literature.

#### 4.2.4 Circular business and industrial models

Services are a part of circular business and industrial models in Helsingin Sanomat. According to the EU and Sitra in article 29, circular economy will bring a lot of new jobs to the market, most of which will be in the service sector. Circular economy increases the need for services such as repair services and disassembling services (media article 9). They replace the need for virgin raw material extraction and manufacturing new products (media articles 7 and 36).

Service based business models such as leasing and renting, are seen to become more common in a circular economy (media articles 24 and 8). Products are conceptualized as services (media articles 46 and 58). The automotive industry is a good example of this (media article 49). Large companies such as Caterpillar and Rolls Royce have been seen to move over towards renting their vehicles (media article 8). When the device is returned to the manufacturer, the materials can be used to manufacture a new device (media article 8). Article 54 introduces Onnibus, an affordable bus company as a circular economy consistent business. Article 40 introduces Stockmann's new line of business in selling secondhand clothing and associates it with circular economy.

Existing companies and lines of business can extend their operations by offering maintenance, repair and modular parts for existing products. The technology industry is presented as a good example of this in article 45. Many companies offer extended services for the whole lifecycle of the product, e.g. for tractors (Valtra Oy), power plants (Wärtsilä Oy), cranes (Konecranes Oyj) and lighting (Ledil Oy).

Circular economy also increases demand and opens business opportunities in certain lines of business such as waste management, recycling and secondhand retail. Circular economy needs companies that collect waste, sort it and process it into a form where it can be used as raw material for new products (article 9). Appliances and technologies that enable these functions are also needed (media article 9).

Industrial symbiosis, where industries work together to utilize each other's waste is also brought up in the articles (media article 24). E.g. in article 41, an example is given where a slaughterhouse is built next to a fish farm that utilizes the residue and waste of the slaughterhouse (media article 41).

According to article 49, circular economy principles can spread even to developing countries where environmental laws and regulations are not effective through requirements of global corporations. If large global companies require circular economy consistent operations from their local cooperative partners, businesses can act as a distributor of circular economy principles.

The same attributes given to circular business and industrial models in the academic literature were covered in the Helsingin Sanomat articles: circular business models, collaborative business and industrial models as well as service orientation.

#### 4.2.5 Supporting tools

As in the academic literature, the most common supporting tool mentioned in the Helsingin Sanomat articles are policies and legislation. The power of taxation is emphasized in Helsingin Sanomat as a tool for directing towards circular economy via minimising waste, increasing recycling rate and reuse functions (media article 3). The national waste plan that was in course of preparation at the time is discussed in article 9 as a concrete measure of renewing waste politics and increasing the recycling rate and circular economy in Finland. The same article also mentions taxation as a tool for easing the prerequisites of operations for professions that are important in a circular economy such as repairers of many kind. Alanko-Kahiluoto in article 10 mentions waste incineration taxation, virgin raw material extraction taxation and mining taxation as means of enhancing circular economy because they would increase the reutilisation of materials as opposed to incinerating them and extracting new materials. Fertiliser taxation is mentioned a means of enhancing the recycling of nutrients in article 15.

In addition to enhancing the use of recycled materials, laws and regulations can in some cases also prevent the use of recycled materials because of safety reasons. Article 30 brings up the issue of the safety of recycled materials, as sometimes the materials are harmful to use because of harmful matter they might contain. Therefore, the use of recycled material in e.g. construction requires the approval of the authorities.

Digitalisation provides tools for implementing circular economy (media article 24). Digital platforms such as apps are presented as a way of utilising resources efficiently in a circular economy (media article 11). Digital platforms also ease collaborative consumption and recycling. One example of this are the previously mentioned food recycling apps ResQ and Lunchie discussed in articles 42, 43 and 61.

Technological development that is emphasized in the research literature is also mentioned in the data. Article 43 mentions that technological development enables materials to stay in the loop for as long as possible in a circular economy. Technologies that would enable the extraction of protein from waste food are discussed in media article 36. The development of such technologies would make it possible for Finland to stop importing soy from abroad as Finland would have enough protein of its own.



The supporting tools identified in the academic literature could not all be identified in the data. For example, the academic literature mentions Life cycle analysis (LCA) several times as a tool for circular economy development. LCA was not mentioned in the data.

#### **4.2.6 Collaborative consumption**

Collaborative consumption is often associated with *sharing economy* in the data (media articles 4, 6, 11 and 57). Sharing economy is associated as a part of circular economy. In a sharing economy, products are not individually owned. The owners are turned to users. Products are consumed together by sharing, renting, leasing and co-buying. Popular examples of items that can be rented in a sharing economy are tools such as drilling machines and cleaning equipment such as steamers (media articles 33 and 36). The sharing economy is also associated with platforms such as Airbnb and Uber, where individual people can offer services in article 53. Public transportation and companies such as Onnibus, providing budget bus transportation, are also associated with collaborative consumption and circular economy in the data (media articles 24 and 54).

To form the main feature groups of circular economy for this study, the collaborative consumption feature was paired up with service orientation and change in attitudes and values of consumers. The dimension of change in attitudes and values of consumers to enable collaborative consumption was not discussed in the Helsingin Sanomat articles.

#### **4.2.7 Renewable resources**

According to Helsingin Sanomat developing renewable materials and giving up unrenovable ones are practices that align with circular economy principles. Article 66 presents a start-up company that has developed renewable packaging materials as an alternative for plastic and has won an international circular economy competition with their invention. Renewable energy and fuel solutions are mentioned in several articles as a part of circular economy (media articles 5, 8, 43, 56, 64). Biogas production, as presented in media article 56, can utilize sludge, biodegradable waste and manure of households and industries. Eliminating toxic chemicals is one of the attributes of the renewable resources feature group in this study but it was not discussed in the data.

## 5 DISCUSSION

### 5.1 Answering the research questions

#### 5.1.1 How is the concept of circular economy comprehended and assessed in the Finnish media?

The research shows that the discussion on circular economy has activated during the years 2015 to 2017. The number of media articles containing a definition for the concept has grown every year. In 2016 the number of articles grew 5% compared to the previous year. Major growth could be detected between the years 2016 and 2017 as during 2017 the number of articles grew 55% compared to the previous year. This indicates that the interest about the topic of circular economy has increased among the Finnish media during the past two years, especially during the year 2017.

The analysis reveals that the most frequent definition given to the concept of circular economy in the Finnish media during the years 2015-2017 was recycling. 63% of the Helsingin Sanomat articles containing a definition for circular economy associated it with recycling. Circular economy can be easily associated with recycling because even the name of the concept points towards 'closing the cycle', which, in a consumer's point of view, can be easily accomplished by recycling. Recycling is also the most frequent definition given to circular economy in the academic sources and can be seen as the cornerstone of the concept. In a way all other attributes support the success of recycling of all materials. The contrast of the frequency between the two most frequent definitions highlights the supremacy of recycling as the most common definition for circular economy.

The second most frequent definition given to the concept was reuse, which appeared in 34% of the media articles. In the academic literature reuse and recycling were the most frequent attributes of circular economy and appeared in the same number of sources. However, in the media data articles the reuse attribute was emphasized less than in the academic sources.

Circular business and industrial models was the third most frequent attribute appearing in 24% of the Helsingin Sanomat articles. The academic sources used it as an attribute of circular economy in 74% of the sources, and was the fourth most common attribute appearing in the literature after recycling, reuse and design.

The design and supporting tools attributes were the fourth most frequent both appearing in 13% of the Helsingin Sanomat articles. In the academic literature on the other hand, it was the third most frequent attribute appearing in 90% of the academic sources. The design attribute has the largest difference in the appearance percentage between the academic and the media data sources. This means that it is the characteristic that is most undermined in the media.

Two of the most infrequent attributes in the media data, collaborative consumption and renewable resources, were also the most infrequent attributes in the academic literature. The second most infrequent attribute in the data was collaborative consumption, which appeared in 10% of the Helsingin Sanomat articles. The most infrequent attribute in the data was renewable resources appearing in 7% of the Helsingin Sanomat articles.

The discussion on circular economy during the researched time period appeared dominantly in opinionated texts. 44% of the Helsingin Sanomat articles appeared in either the Opinion section of the newspaper or in the Leader articles, which are also opinionated texts indicating a clear opinion or view of the author. Another observation that can be made based on the analysis is that the discussion about circular economy appears among discussion about economic issues. 23% of the articles appeared in the Economy section of the newspaper. This is reasonable because circular economy is an economic model. The rest of the articles were shattered among the rest of the newspaper sections with only one to four articles per section, so notable observations cannot be made on the other areas of discussion.

### **5.1.2 Do the definitions given to circular economy in the media differ from those given in the literature?**

In this study the definitions given to the concept of circular economy in the media was assessed according to the definitions given in academic sources. Thus, the definitions given in the academic sources were assessed first and the same definitions were searched for in the media data to form a comparison of the appearance of the definitions. Analysis framework 1, presented in **Table 10**, assesses the appearance of the academic definitions in the data. **Figure 5** presents the findings of analysis framework 1 and illustrates the frequency of each characteristic alongside with the frequency of the same characteristic in the academic sources. **Table 11** presents the differences of the frequency of occurrence of each characteristic in the literature and in the data.

The analysis reveals that the definitions given to circular economy in the academic literature are vaster and more definitions are given in each source than in the data. Every definition of the concept appears more frequently in the academic literature than in the media data. Although the frequencies of the appearance of each characteristics are different, similar definitions are given in both sources.

- |  |
|--|
| <ol style="list-style-type: none"> <li>1. Design</li> <li>2. Reuse</li> <li>3. Circular business and industrial models</li> <li>4. Supporting tools</li> <li>5. Recycle</li> <li>6. Renewable resources</li> <li>7. Collaborative consumption</li> </ol> |
|--|

Table 14: Main characteristic groups of circular economy according to the difference of their appearance in the research literature and in the data

The design feature of circular economy has the largest difference of appearance in the media data and in the academic literature. The importance of integrating circular economy into the design phase is emphasized in 90% of the academic literature sources, while it is emphasized in only 13% of the media sources. This gives a 77% difference between the academic literature and the media sources.

The difference of the occurrence of the reuse characteristic was the second largest in **Table 11** after the design characteristic. Reuse was emphasized in 97% of the academic sources, while it was only emphasized in 34% of the media sources. The difference of these two is 63%.

Circular business and industrial models were emphasized in 74% of the academic literature sources and in 24% of the media data sources, giving a difference of 50%. Supporting tools were mentioned in 58% of the academic literature sources and in 13% of the media data sources, which gives a 45% difference. Recycling was mentioned as a circular economy definition in 97% of the academic literature and in 63% of the media data, giving a difference of 34%. Renewable resources were mentioned in 40% of the academic literature and in 7% of the media data with a difference of 33%. Finally, collaborative consumption was mentioned in 39% of the academic literature and 10% of the media data with a difference of 29%.

The difference of the frequency of each characteristic in the academic literature and in the media gives different importance to each characteristic as a definition for circular economy. The more frequently each characteristic occurs, the more importance is given to it as a definition for circular economy.

Based on the theoretical framework about the power of media in creating definitions, we can imply the consequences of the analysis results. The *framing* theory and the *attribute agenda-setting* theory are presented in chapter 2.2 and imply that the attributes given in the media to different issues and concepts are adopted by the public. Thus, the importance of each characteristic of circular economy in the media shape the importance of the characteristic in defining circular economy among the public.

Karvonen's (1999) model of forming an image implies that the public forms a perception about an issue based on the information received from the media. The media has the power to include or exclude any information it sees fit.

The image about circular economy is formed based on the information provided by the media for those people that only rely on media as a source of information of circular economy.

The theory implies that the public is getting a different perception of the concept of circular economy through the media than what the correct definition would be according to the academic sources. The public is forming an image about circular economy through the media based on the importance of the characteristics that the media sees fit on distributing. For example, the design, reuse and circular business and industrial models are the three characteristics are most underrated among the media compared to the academic sources. Therefore, the public forms an image about circular economy with an underrated emphasis on the design, reuse and circular business and industrial models- characteristics.

What is the significance of this conclusion? Circular economy is a system that requires a thorough shift in the economy to be successful. As the concept of circular economy is comprehended incorrectly among the public, the full potential of the concept is misunderstood and the success of circular economy in its full potential is compromised.

## **5.2 Relationship with previous research**

Circular economy is a somewhat new concept and has been gaining increasing attention among the scientific community during the past years. The growing interest in the topic can be seen in the increasing amount of published research; In 2014 only 30 peer-reviewed articles were published on the topic and in 2016 the amount had grown to over 100 articles (Geissdoerfer et al. 2017).

Circular economy application in China has been a popular subject in academic articles. The impacts of unsustainable economic growth has already caused serious health and environmental problems in China. The pressure to find more sustainable economic development models has pushed China to apply circular economy solutions in several industries. (Ghisellini et al. 2016)

Several studies assess the concept of circular economy (e.g. Ghisellini et al 2016, Geng et al. 2012, Geissdoerfer et al. 2017) but only one study by Kirchherr et al. (2017) analyses the definitions given to circular economy. No studies analyse the definitions given to circular economy in the media let alone in the Finnish media.

## **5.3 Reliability and validity**

According to Hirsjärvi, Remes and Sajavaara (1997 p.213), the reliability of every research should be evaluated. Reliability and validity are one type of measurement of the credibility and trustworthiness of a research and are used to evaluate

the credibility of this research. Reliability and validity are assessed slightly differently in studies that have used qualitative and quantitative research methods.

Reliability measures whether the same results would have been acquired if the research would be conducted again. The reliability of quantitative studies can be assessed with statistical methods whereas the reliability of a qualitative research can be assessed according to in-depth descriptions of the research process. As Hirsjärvi et al. (1997, p. 214) state: "The reliability of a qualitative research is improved by a precise description of the conduction of the research process." Tuomi and Sarajärvi (2009) agree to this.

This paper took mainly a qualitative approach including a qualitative content analysis along with quantifying the data. The content analysis in this paper was very systematic; the content analysis questions were defined prior to conducting the analysis, a framework was used to combine and present the results and the analysis process was described clearly. The content analysis framework method that was used in this research is a very systematic and reliable analysis method.

One threat to the reliability would be to categorise the Helsingin Sanomat articles into the wrong circular economy main feature groups, which were formed for this research. As there are so many features to circular economy, the features can be similar and partially overlap with each other. This obstacle was overcome by describing and defining each main feature group carefully and differentiating them from each other before conducting the analysis. Therefore, before filling out the analysis framework it was clear what the difference between the categories were and which features belonged to which category.

Validity measures whether the research investigates what it is supposed to (Hirsjärvi et al. 1997 p. 213-214). The aim of this research was to investigate how the concept of circular economy has been comprehended and assessed in the Finnish media. The approach taken to answer the research questions and fulfil the aim of the research was to analyse the features that were associated with the term circular economy in Finnish media outlets. Because circular economy is a concept consisting of multiple dimensions and policies it was important to assess which dimensions were mentioned in the media.

To ensure validity, the media source chosen had to be one which represents mainstream media as media outlets of narrow viewership or emphasizing on content in a certain sector might give a narrow expression to the term and emphasize only on some areas of circular economy. Helsingin Sanomat was chosen as the source of media data because it represents mainstream media and its readership consists of people in different age groups, with different kinds of backgrounds and working in different sectors. It was considered important to measure media outlets of broad viewership that represents a large group of people.

To investigate how the term circular economy was assessed in Helsingin Sanomat, four content analysis questions were made. For the research to be valid, it was important to make relevant content analysis questions. The questions selected are presented in **Table 9**. The first content analysis framework analysed how often the academic features of circular economy appeared in the media data.

This framework could then be used to compare the appearance rates of each feature of circular economy in the academic literature and in the media data. The second content analysis topic, “Academic features of circular economy appearing in the media data during different years,” was made to analyse the transformation of the assessment and definitions given to the concept of circular economy during the time period. The third framework analysed how the academic features appeared in different sections of the newspaper.

## 5.4 Suggestions for future research

The perceptions of circular economy among different entities could be researched further as they impact the way in which the concept is implemented by the different entities. The media is only one player that can be researched in how circular economy is comprehended and its effect on the perceptions of circular economy among the public is only one viewpoint that can be taken.

I suggest future research is done on how the public, normal citizens, comprehend circular economy. Because circular economy is such a comprehensive system and it covers the operations of all entities in a society to be successful, it is important that normal citizens also comprehend the concept correctly.

Another viewpoint that could be taken is how the decision-makers in our society comprehend circular economy. Decision makers have a lot of power in transforming the current economic system into a circular economy. In a successful circular economy laws and regulations must align with the principles of the concept.

The final viewpoint that I suggest is taken in future research is the viewpoint of corporations. I would suggest researching how corporations that implement circular economy and communicate circular economy as a part of their business operations comprehend the concept. Circular economy is a very trendy concept at the moment and it would be interesting to research if the concept is misused because of its trendiness.

## REFERENCES

- Atlason, R., Giacalone, D., & Parajuly, K. 2017. Product design in the circular economy: Users' perception of end-of-life scenarios for electrical and electronic appliances. *Journal of Cleaner Production*. Vol. 168. No. 1, pp. 1059-1069.
- Bell, T. & McCombs, M. 1996. *The Agenda-setting Role of Mass Communication*. Austin. University of Texas. In: Salwen, M. & Stacks, D. 1996. *An Integrated Approach to Communication Theory and Research*. Mahwah, New Jersey. Lawrence Erlbaum Associates, Inc. pp. 93-110.
- Castellani, V., Sala, S. & Mirabella, N. 2015. Beyond the throwaway society: A life cycle-based assessment of the environmental benefit of reuse. *Integrated Environmental Assessment and Management*. Vol. 11. No. 3, pp. 373-382.
- Cohen, B. 1963. *The Press and Foreign Policy*. Princeton, New Jersey. Princeton University Press.
- Cooper, S., Giesekam, J., Hammond, G., Norman, J., Owen, A., Rogers, J., & Scott, K. 2017. Thermodynamic insights and assessment of 'the circular economy'. *Journal of Cleaner Production*. Vol. 162. No. 1, pp. 1356-1367.
- Curran, J. 2002. *Media and Power*. London. Routledge.
- Charnley, F. & De Los Rios, I. 2017. Skills and capabilities for a sustainable and circular economy: The changing role of design. *Journal of Cleaner Production*. Vol. 160. No. 1, pp. 109-122.
- Di Maio, F. & Rem, P. 2015. A Robust Indicator for Promoting Circular Economy through Recycling. *Journal of Environmental Protection*. Vol. 5, pp. 1095-1104.
- Elia, V., Gnani, M., & Tornese, F. 2017. Measuring circular economy strategies through index methods: A critical analysis. *Journal of Cleaner Production*. Vol. 142. No. 1, pp. 2741-2751.
- Ellen MacArthur Foundation. 2012. *Towards the Circular Economy*. Vol. 1. Retrieved March 8th, 2017 from <https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf>
- Entman, R. 1993. Framing: Toward Clarification of a Fractured Paradigm. *Journal of Communication*. Vol. 43. No. 4, pp. 51-58.
- Eriksson, P. & Kovalainen, A. 2008. *Qualitative Methods in Business Research*. Sage Publications Inc.
- Eskola, J. 2001. Laadullisen tutkimuksen juhannustaiat. Laadullisen tutkimuksen analyysi vaihe vaiheelta. In: Aaltola, J. & Valli, R. 2001. *Ikkunoita tutkimusmetodeihin II. Näkökulmia aloittavalle tutkijalle tutkimuksen teoreettisiin lähtökohtiin ja analyysimenetelmiin*. Jyväskylä. PS-kustannus. pp. 133-157.
- Eskola, J. & Suoranta, J. 1998. *Johdatus laadulliseen tutkimukseen*. Tampere. Vastapaino.



- Fiske, J. 1992. Merkkien kieli: Johdatus viestinnän tutkimiseen. Tampere. Vastapaino.
- Franklin-Johnson, E., Figge, F., & Canning, L. 2016. Resource duration as a managerial indicator for circular economy performance. *Journal of Cleaner Production*. Vol. 133. No. 1, pp. 589-598.
- Franco, M. 2017. Circular economy at the micro level: A dynamic view of incumbents' struggles and challenges in the textile industry. *Journal of Cleaner Production*. Vol. 168. No. 1, pp. 833-845.
- Gamson, W. & Modigliani, A. 1989. Media Discourse and Public Opinion on Nuclear Power: A Constructionist Approach. *American Journal of Sociology*. Vol. 95. No. 1, pp. 1-37.
- Geissdoerfer, M., Savaget, P., Bocken, N., & Hultnik, E. 2017. The Circular Economy – A new sustainability paradigm?. *Journal of Cleaner Production*. Vol. 143. No. 1, pp. 757-768.
- Geng, Y., Fu, J., Sarkis, J. & Xue, B. 2012. Towards a National Circular Economy Indicato System in China: an Evaluation and Critical Analysis. *Journal of Cleaner Production*. Vol. 23. No. 1, pp. 216-224.
- Genovese, A., Acquaye, A., Figueroa, A., & Koh, S. 2017. Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications. *Omega*. Vol. 66. Part B, pp. 344-357.
- Ghisellini, P., Cialani, C. & Ulgiati, S. 2016. A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*. Vol. 114. No. 1, pp. 11-32.
- Helsingin Sanomat. N.d. Mieliipide. Retrieved December 22<sup>nd</sup>, 2017, from <https://www.hs.fi/mieliipide/>
- Hirsjärvi, S., Remes, P., & Sajavaara, P. 1997. Tutki ja kirjoita. Helsinki. Kustannusosakeyhtiö Tammi.
- Iacovidou, E., Millward-Hopkins, J., Busch, J., Purnell, P., Velis, C., Hahladakis, J., Zwirner, O., & Brown, A. 2017. A pathway to circular economy: Developing a conceptual framework for complex value assessment of resources recovered from waste. *Journal of Cleaner Production*. Vol. 168. No. 1, pp. 1279-1288.
- Ikävalko, E. 1995. Käytännön tiedottaminen – Yhteisöviestinnän käsikirja. Helsinki. Inforviestintä Oy.
- Kantola, A., Moring, I. & Väliverronen, E. 1998. Media analyysi – Tekstistä tulkintaan. Helsingin yliopiston Lahden tutkimus- ja koulutuskeskus.
- Karppinen, K., Ala-Fossi, M., Alen-Savikko, A., Hilden, J., Jääsaari, J., Lehtisaari, K. & Nieminen, H. 2015. Kenen Media? Tampere. Vastapaino.
- Karvonen, E. 1999. Elämää mielikuva yhteiskunnassa – Imago ja maine menestystekijöinä myöhäismodernissa maailmassa. Helsinki. Gaudeamus Helsinki University Press.
- Kirchherr, J., Reike, D., & Hekkert, M. 2017. Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation & Recycling*. Vol. 127. No. 1, pp. 221-232.

- Krippendorff, K. 2004. *Content Analysis – An Introduction to Its Methodology*. Sage Publications Inc. 2nd edition.
- Kunelius, R. 2003. *Viestinnän vallassa – Johdatus joukkoviestinnän kysymyksiin*. Helsinki. WSOY.
- Landaburu-Aguirre, J., Garcia-Pacheco, R., Molina, S., Rodriguez-Saez, L., Rabadan, J., & Garcia-Calvo, E. 2016. Fouling prevention, preparing for re-use and membrane recycling. Towards circular economy in RO desalination. *Desalination*. Vol. 393. No. 1, pp. 16-30.
- Lazarevic, D., & Valve, H. 2017. Narrating expectations for the circular economy: Towards a common and contested European transition. *Energy Research & Social Science*. Vol. 31. No. 1, pp. 60-69.
- Lieder, M. & Rashid, A. 2016. Towards circular economy implementation: a comprehensive review in context of manufacturing industry. *Journal of Cleaner Production*. Vol. 115. No. 1, pp. 36-51.
- Liguori, R. & Faraco, V. 2016. Biological processes for advancing lignocellulosic waste biorefinery by advocating circular economy. *Bioresource Technology*. Vol. 215. No. 1, pp. 13-20.
- Lippmann, W. 1922. *Public Opinion*. New York. Harcourt, Brace and Company.
- McCombs, M. & Shaw, D. 1972. The agenda-setting function of mass media. *Public Opinion Quarterly*. Vol. 36. No. 2, pp. 176-187.
- McCombs, M. 1977. Agenda Setting Function of Mass Media. *Public Relations Review*. Vol. 3. No. 4, pp. 89-95.
- Media Audit Finland Oy. 2015. LT ja JT Tarkistustilasto 2015. Retrieved March 1st, 2017 from <http://mediaauditfinland.fi/wp-content/uploads/2016/06/LTtilasto2015.pdf>
- Michelini, G., Moraes, R., Cunha, R., Costa, J., & Ometto, A. 2017. From linear to circular economy: PSS conducting the transition. *Procedia CIRP*. Vol. 64. No. 1, pp. 2-6.
- Mickwitz, P., Seppälä, J., Kauppi, L. & Hilden, M. 2014. Kohti hiilineutraalia kiertotaloutta – tutkimus vauhdittamaan muutosta. SYKE Policy Briefs. Retrieved March 9th, 2017 from [https://helda.helsinki.fi/bitstream/handle/10138/135242/SYKE\\_Policy\\_Brief\\_13062014.pdf?sequence=1](https://helda.helsinki.fi/bitstream/handle/10138/135242/SYKE_Policy_Brief_13062014.pdf?sequence=1)
- Murray, A., Skene, K. & Haynes, K. 2017. The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context. *Journal of Business Ethics*. Vol. 140. No. 3, pp. 369-381.
- Nieminen, H. & Pantti, M. 2004. *Media markkinoilla – Johdatus joukkoviestintään ja sen tutkimiseen*. Helsinki. Loki Kirjat.
- Pomponi, F. & Moncaster, A. 2017. Circular economy for the built environment: A research framework. *Journal of Cleaner Production*. Vol. 143. No. 1, pp. 710-718.
- Richardson, R. 2013. *Building a Green Economy: Perspectives From Ecological Economics*. East Lansing: Michigan State University Press.
- Sarajärvi, A. & Janhonen, S. 2000. The Evaluation of Nursing Needs as Described by Nursing Student. In: Sarajärvi, A. & Tuomi, J. 2000. *Developing Nursing*

- Practice and Research. Proceedings. Seinäjoki Polytechnic: Publications A: Researches 2/2000, 361. pp. 371-543.
- Saunders, M., Lewis, P., & Thornhill, A. 2012. *Research Methods for Business Students*. Harlow. Pearson Education Limited.
- Sauve, S., Bernard, S., & Sloan, P. 2016. Environmental sciences, sustainable development and circular economy: Alternative concepts for trans-disciplinary research. *Environmental development*. Vol. 17. No. 1, pp. 48-56.
- Seppänen, J. & Väliverronen, E. 2013. *Mediayhteiskunta*. Tampere. Vastapaino.
- Singh, J. & Ordonez, I. 2016. Resource recovery from post-consumer waste: important lessons for the upcoming circular economy. *Journal of Cleaner Production*. Vol. 134, pp. 342-353.
- Sitra. 2014. Kiertotalouden mahdollisuudet Suomelle. Sitran selvityksiä 84. Retrieved March 10th, 2017 from <https://media.sitra.fi/2017/02/23221555/Selvityksia84.pdf>
- Sitra. 2016. Kierrolla kärkeen – Suomen tiekartta kiertotalouteen 2016-2025. Sitran selvityksiä 117. Retrieved March 10th, 2017 from <https://media.sitra.fi/2017/02/27175308/Selvityksia117-3.pdf>
- Smith, P., Baille, J., & McHattie, L. 2017. Sustainable Design Futures: An open design vision for the circular economy in fashion and textiles. *The Design Journal*. Vol. 20. sup. 1, pp. 1938-1947.
- Spaulding, C., Stacks, D., & Zongchao, C. 2015. *Media Effects*. International Encyclopedia of the Social & Behavioral Sciences, 2nd edition. Elsevier Ltd.
- Spring, M. & Araujo, L. 2017. Product Biographies in Servization and the Circular Economy. *Industrial Marketing Management*. Vol. 60. No. 1, pp. 126-137.
- Tuomi, J. & Sarajarvi, A. 2002. *Laadullinen tutkimus ja sisällönanalyysi*. Kustannusosakeyhtiö Tammi.
- University of Jyväskylä Language Centre. N.d. *Mielipidekirjoituksen tyypit: Pääkirjoitus*. Retrieved December 22nd, 2017, from [https://kielikompassi.jyu.fi/opetus/kirjoitus/kirjoituskurssi/kann\\_miel\\_paakirj.shtml](https://kielikompassi.jyu.fi/opetus/kirjoitus/kirjoituskurssi/kann_miel_paakirj.shtml)
- Urbinati, A., Chiaroni, D. & Chiesa, V. 2017. Towards a New Taxonomy of Circular Economy Business Models. *Journal of Cleaner Production*. Vol. 168. No. 1, pp.487-498.
- Wiio, J. 2006. *Media uudistuvassa yhteiskunnassa. Median muuttuvat pelisäännöt*. Sitran raportteja 65. Helsinki. Edita Prima Oy. Retrieved October 16th, 2017 from <https://media.sitra.fi/julkaisut/Raportti65.pdf>
- World Economic Forum. 2014. *Towards the Circular Economy: Accelerating the Scale-Up Across Global Supply Chains*. Geneva, Switzerland.
- Zink, T. & Geyer, R. 2017. Circular Economy Rebound. *Journal of Industrial Ecology*. Vol. 21. No. 3, pp. 593-602.

## APPENDICES

## Appendix 1: Theory analysis framework

Name of theoretical source / Characteristics of circular economy used	Reuse	Recycle	Designing out waste	Reduce	Circular business models	Change in consumption habits	Service orientation	Collaborative business and industrial models	Policies and legislation	Technological advancement	Innovations	Renewable energy	Difference between material flows : technical and biological	Collaborative consumption	Renewable materials	Change in attitudes and values	Green supply chain management	Recover systems	Circular economy indicators	LCA	Reverse supply chain management	Elimination of toxic chemicals
Atlason et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Franklin-Johnson et al. 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Castellani et al. 2015	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cooper et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
De Los Rios & Charnley 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Di Maio & Rem 2015	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Elia et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ellen Macarthur Foundation 2012	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Franco 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geissdoerfer et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geng et al. 2012	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Genovese et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ghislaini et al. 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Iacovidou et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Kirchherr et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Landaburu-Aguirre et al. 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Lazarevis & Valve 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Lieder & Rashid 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Liguori & Faraco 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Michelini et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Murray et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Pomponi & Moncaster 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Sauve et al. 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Singh & Ordonez 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Sitra 2014	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Sitra 2016	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Smita et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Spring & Araujo 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Urbanati et al. 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
World Economic Forum 2014	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Zink & Geyer 2017	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	30 97%	30 97%	28 90%	24 77%	24 74%	23 74%	20 65%	20 65%	18 58%	18 58%	17 55%	14 45%	13 42%	12 39%	11 35%	10 32%	8 26%	8 26%	7 23%	6 19%	6 19%	5 16%